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ORIGINAL COMMUNICATIONS.

STATUS OF BACTERINS AND TUBERCULINS, PROPHYLACTICALLY, DIAGNOSTICALLY, AND THERAPEUTICALLY.*

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Wright's assertion, that we have in the employment of bacterial vaccines one of the most valuable assets in medicine, marked the revival and world-wide unprecedented interest in this method of therapy. So extensive has been its application that it has appeared advisable, if not absolutely necessary, from time to time to summarize the status of bacterin therapy: first, because of its established value medically, and secondly, because there is no phase of therapeutics generally more misunderstood and misused. Four years ago I published an article[1] similar in title to the present. It is desired now to crystallize the substance of that article, alluding to any new and worthy advances, particularly refinements or improvements in the preparation of bacterins, and to treat the subject practically from the standpoint of the various diseases wherein bacterins are beneficial. Obviously, the title of this paper precludes any consideration of serum therapy or passive immunization.

An extensive experience has strongly convinced me that bacterin therapy in the hands of the general practitioner is not destined to realize the fulfilment of its promise. It seems not to be appreciated by physicians generally that bacterins are agents capable equally for good or evil. Careless, ignorant and incompetent administration not only discredits an otherwise valuable remedy, but deprives the patient of his natural resources for recovery. Two solutions for the problem are offered: either the general practitioner contemplating treatment by bacterins should familiarize himself more with immunology, including bacteriology and laboratory methods,[1] or he should refer his patient to or coöperate with an immunologist, precisely as he is accustomed at times to consult an ophthalmologist. No physician would sanction for a minute the use of digitalis, strychnine or morphine without a knowledge of the pharamacodynamical effects of these drugs, yet he hesitates not to order from his drug store "a vaccine" and proceeds with its administration knowing little or nothing of the physiological effects of biological products.

Indications, Contraindications, and Causes of Failure.—It is generally admitted that bacterins operate by stimulation of tissue cells locally at the site of subcutaneous or intramuscular injection to the production of specific antibodies, be they named agglu-

*From the William Pepper Laboratory of Clinical Medicine, University of Pennsylvania. Read before the Lycoming County Medical Club, Williamsport, Pa., Aug. 27, 1914.

[1]"The present Status of Bacterin Therapy." International Clinics, Vol. III, Twentieth Series, 1910, p. 59.

[1]The writer believes that more provision for definite and practical instruction to undergraduates in our medical schools relative to immunology, especially bacterin therapy, should be given.

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tinins, bacteriolysins, opsonins, or what not. Theoretically, therefore, bacterin therapy is indicated only in chronic or possibly also subacute localized infections; it is impossible to conceive by any stretch of the imagination the rationale or at least the necessity of their employment in acute or diffused affections in which the human organism is already overloaded with the products of a living antigen, or indeed its defenses actually demolished and its system overwhelmed by the invading microbes; namely, such states as bacteriemia or septicemia. Indeed, bacterial inoculations in such conditions not only add insult to injury, but may be the determining forces for death instead of prolonged recovery. Administered in acute localized affections, as a rule unwisely perhaps, and certainly so unless the indications of the opsonic index are followed, either of two possible results may be expected. If the bodily resources are barely able to cope with the situation and the local infection be very active, additional injection of antigen will turn the tide of battle against the individual, and an otherwise acute course be converted into a chronic or vital issue. On the other hand, if the individual's defenses are great and his infection slight, an inoculation of bacterin may increase his specific antibodies, thereby enabling him to abort or at least shorten the attack of his local infection. Thus in the latter case the probability is that the patient if left to himself will readily conquer his infection in due time. The discrimination, in view of the danger involved between leaving nature to herself and intervention by bacterin therapy, can, in my opinion, be made only by recourse to determinations of the opsonic index. These acutely localized and bacteriemic conditions constitute realms for the wiser and more logical practice of serum therapy or passive immunization.

Allusion must be made to certain other causes of failure by those practicing bacterial inoculations. Summarily, they may be stated to be: (1) Utilization of the improper bacterium, whether autogenous or heterogenous; (2) routine employment of stock instead of autogenous bacterins; (3) ignorance as to administration, either size of doses or intervals of inoculation; and (4) disregard of commonly associated conditions.

The mistake of utilizing the wrong germ could be obviated by the strict employment of autogenous bacterins whenever possible. This implies technical laboratory and bacteriological knowledge by each physician contemplating bacterin therapy, or that he consult with or refer his patient to an immunologist. The immunologist best fitted to conduct bacterin therapy is he who by virtue of technical laboratory experience can properly prepare bacterins, determine the opsonic index when indicated, etc. Thus there would arise no shifting of responsibility between the laboratory worker making up and standardizing the bacterial suspension and the general practitioner desiring to give the inoculations. Otherwise, in the event of an unhappy result, the former will accuse the latter of incompetence and the latter the former of faulty technique. This seems like stringent doctrine, but I believe in the long run will redound not only to the credit of physicians and bacterin therapy, but also and especially to the better health of patients. Even in the experience of expert bacteriologists it becomes at times no easy task to isolate from a mixed infection the fundamental etiological bacterium. Obviously, a bacterin prepared from a superimposed or secondary infection, even though that bacterium be preponderant, would produce little or no effect curatively upon the primary or underlying disease.

Stock bacterins, if employed, a procedure at times advisable, should be polyvalent —that is, constituted by as many strains as are obtainable of the particular species of bacterium in question. Caution should always be exercised to determine by bacteriological methods the exact identity of the infecting bacterium in a given case before proceeding with the "supposedly" correct stock bacterin. On more than one oc-

casion I have found patients falsely immunized with a stock preparation devoid of the bacterium actually causing the disease. Such failures discredit physicians more than the mode of therapy. The advantage of the autogenous preparation naturally is that the patient will be immunized with the exact strain of the germ by which he has been infected, leading to a more definite and decisive result. The commercial so-called "mixed bacterins or vaccines" for therapeutic purposes cannot be too highly condemned, simply on scientific grounds; prophylactically their employment would appear rational. It is not true that the injection of a few extra brands of germs, in addition to that responsible for the main infection or possibly concomitant infections, is without deleterious effect. Each variety of bacterin thus injected stimulates the tissue cells to the production of its specific antibody. This certainly is an unnecessary work or drain on the part of the tissue cells, so far as the irrelevant bacteria are concerned, and has no effect therapeutically upon the pathological process. Again, the bacterin, especially if heterogenous, may be unfit for use—that is, too old or in a state of autolysis or chemically contaminated from its container, be it bottle, ampoule, or syringe.

A fact of much importance in the preparation of a bacterin, whether autogenous or stock, is that it should not be overheated, thereby interfering with its properties of immunization. The correct degree of temperature is merely the thermic death point for the respective bacterium. I have demonstrated by animal experimentation that a higher degree of immunity is obtainable by inoculations with living bacteria, and I firmly believe the time is not far distant when human inoculations with many attenuated or living bacteria, in expert hands, will be both an unobjectionable and common procedure.

Many failures in bacterin therapy result from improper administration. The doses given are either too large or too small, more frequently the former. The dose must be cautiously gauged by the age of the patient, the nature and gravity of his illness, the acuteness or chronicity of the affection, a non-febrile or febrile condition, and his debilitated or toxic state. The golden rule to follow is, the sicker the patient the smaller should be the dose. The dose of the more virulent bacteria, as the streptococcus pyogenes, the pneumococcus, the gonococcus, etc., should be considerably smaller—that is, one-fourth to one-half that of such organisms as the staphylococcus, the B. coli communis, the B. fluorescens, the B. proteus vulgaris, etc. The initial inoculation in the virulent group may be 25,000,000 to 50,000,000; in the less virulent group the primary injection usually ranges from 50,000,000 to 100,000,000. Subsequent inoculations both as to size of doses and intervals may be governed in the case of most diseases by close and accurate observation of the clinical symptomatology or by the indications of opsonic indices, or by the utilization of both of these controls, which is advisable for the best results in no small number of cases. Generally speaking, the clinical symptoms are of primary importance and the index takes second place; at times, however, these become reversed. It is no easy matter to control properly the process of immunization by study of the clinical symptoms, and success will obtain only by an experienced and careful observation of such trivial symptoms as malaise, indisposition to work or play, bodily aches, grippe-like attacks, headache, deterioration of appetite, slight fever, nausea, variations in weight, leucocytic and hemoglobin determinations, and particularly local manifestations in the diseased region as well as at the site of inoculation. As stated above there are many diseases in which guidance furnished by determinations of the opsonic index is indispensable for the proper execution of bacterin therapy. These include especially deep-seated affections, as bronchitis, pneumonia, certain intestinal infections and diseases of the genito-urinary tract typified by pyelitis, cystitis, seminal vesiculitis, prostatitis, etc. The technique of the opsonic index, to be at all reliable, requires expert laboratory experience, and

its conduct is long, tedious, and tiresome; consequently it will be given no further consideration at this time.

The safest rule to be observed respecting bacterin therapy controlled only by clinical symptomatology is to begin with a very small or assuredly harmless dose; if there be absolutely no reaction, local or general, in two or three days, a second inoculation twice the size of the first may be given, and so on with intervals of three to seven days until reactionary phenomena are observed; the slightest reaction is evidence that the dose has been sufficient if not too large, and indicates that no further inoculations are to be made until all signs of reaction have completely subsided for several days; frequently the next inoculation must be deferred for two or more weeks, and when administered should not exceed in size its predecessor, commonly consisting of only one-half of the previous dose. Strict observance of this dictum is imperative, but unfortunately not in accordance with the instructions furnished the general practitioner by many pharmaceutical firms marketing stock bacterins, and accounts for no small number of failures in bacterin therapy.

Among other causes of failure in biological therapeusis may be mentioned disregard of associated conditions. These are both general and local. The general comprise diabetes, leukemia, intestinal stasis, constipation, and toxicosis. In these states phagocytosis is markedly handicapped or impossible. The local causes responsible for failure include caries, sequestra, and other conditions demanding primary surgical intervention. Again, by virtue of the anatomy of the part, as in chronic otitis media, also on account of the pathology as observed in sinuses, fistulæ, and old abscess cavities, where owing to coagulated fibrin and old inflammatory exudate and cicatrization the diseased area becomes walled off, it is impossible for the systemic blood serum, even though highly opsonized, to bathe the affected part, hence exert a healing influence. Here the rational employment of hyperemia, Wright's solution, citric acid, nuclein, and eliminants and tonics directed to the intestinal tract, kidneys, skin, and liver become indispensable adjuvants converting an otherwise sure failure into natural victory.

I trust that enough has already been detailed to impress forcefully the fact that bacterin therapy, for the fullest realization of its remarkable benefit to mankind, had best be restricted to and conducted by expert hands.

Preparation of Bacterins.—The earliest, simplest and commonest method of bacterin preparation consists in the suspension, standardization, and sterilization of bacterial cultures in salt solution.

Certain investigators have attempted to improve bacterins and enhance their immunizing properties by subjecting the bacteria to a process of autolysis, on the assumption that the autolysate contains toxic or antiopsonic substances, and that the antigenic part of the bacterin depends upon the bacteria themselves minus their extractives. This disintegration of the bacteria is accomplished by treating them with salt solution or alcohol, ether, chloroform, and xylol, followed by filtration and suspension of the residue in normal saline.

Recently, advantage has been taken of Besredka's assertion, founded upon the demonstration of Ehrlich and Morgenroth, that inoculations with sensitized bacteria supersede in effectiveness, rapidity of action, and harmlessness ordinary bacterins or bacterial vaccines. Such sensitized bacterins or "sero-bacterins" are prepared by treating bacteria with their specific immune serum, by which process the bacteria become inseparably joined to their antibodies, thereby in a state, immediately on injection, prepared to be acted upon by the complement of the patient's blood. Thus the usual delay of a week or more required for the patient to form his own antibodies—incidentally also the negative phase and local injectional reaction—using the ordinary bacterins, is avoided, and immunity is secured rapidly and intensively in twenty-four to forty-eight hours. Finally, by virtue of the absence of "negative phases,"

the inoculations may be repeated every day or two, thereby markedly shortening the course of treatment. Should sensitized bacterins fulfil their promise, they will mark the greatest advance thus far in the history of bacterin therapy.

Anaphylaxis.—In connection with bacterin and tuberculin inoculations, the subject of anaphylaxis or hypersusceptibility must receive consideration, although its significance is not so pronounced in bacterial and tuberculin reactions as in "serum sickness," characterized by skin eruptions, fever, joint swellings, lymph nodal enlargements, edema, etc. Von Pirquet has recommended the term "allergy" for the reactive phenomena usually exhibited by an animal after an infection or injection of antigen. These phenomena, if expressive of diminished susceptibility, indicate *prophylaxis;* if of increased sensitiveness, *anaphylaxis.* Hypersusceptibility is induced by an overwhelming dose of antigen, when albumen in the body is broken up into the toxic and non-toxic groups. A repetition of the injection of antigen, at an unfavorable time, causes the body to attack the albumen so vigorously, thereby releasing so much of the toxic group, that it is overcome by the poisonous radical. In the practice of bacterin and tuberculin therapy, one must differentiate between the common expression of susceptibility to increasing dosage, manifested by the ordinary clinical reaction, and the exquisite hypersusceptibility at times observed to follow an ordinary bacterial or antigenic inoculation, when without warning a subsequent inoculation of even a fraction of the former dose produces a marked systemic reaction. The occurrence of this phenomenon may be obviated by suspending for two weeks all inoculations. Treatment may then be resumed by the employment of a very small dose—that is, one-tenth or one-hundredth of the former injection. Therefore, personal experience has taught that better results have attended the process of active immunization, when the treatment has been started with relatively small inoculations, increased in arithmetical or geometrical progression to the therapeutic limit, rather than by recourse to large dosage, thereby establishing immunity and avoiding hypersusceptibility.

Tuberculin, in some of its forms, is a true bacterin, and therefore must receive due consideration. It has been utilized prophylactically, diagnostically, and therapeutically. Thus far the dreams of immunological investigators seeking to employ tuberculin as a preventive against tuberculosis in any form have proved futile. Tolerance to tuberculin probably never confers true immunity against tuberculosis. In a diagnostic and therapeutic capacity, on the contrary, tuberculin has been and is decidedly useful in almost every lesion of the disease, excepting active and generalized infections. For diagnostic purposes Koch's "old tuberculin" or "O. T.," in doses of 0.5. 1.25, 2.5, and possibly 5 milligrams, is unquestionably the best product, and its hypodermic administration the most reliable method. The only exceptions are in certain febrile cases and possibly children, when the cutaneous scarification or von Pirquet procedure, again using "O. T." or the differential method of Detre, may prove superior. The latter employs three tuberculins: (1) "O. T.," (2) human "bouillon filtrate," and (3) bovine "bouillon filtrate," thereby claiming to be able to differentiate the human or bovine type of the disease, the preferable tuberculin to be used in therapy, and by studying the character of the reactions to obtain a guide more reliable than the opsonic index for the control of therapy. Greater difficulty attends the correct interpretation of the reaction than the mere application of the test. Its revelations, however, in experienced hands, are indispensable.

Therapeutically, "bacillen emulsion" or "B. E.," "old tuberculin" or "O. T.," "Tuberkulin Rückstand" or "T. R.," "bouillon filtrate" or "B. F.," and "tuberculinum purum" or "T. P." appear to be the preferable preparations about in the order named. Tuberculinum purum possibly should have first instead of last choice. It consists of Koch's old tuberculin treated with alcohol, ether, chloroform, and xylol in order to re-

move the toxic deutero-albumoses and the glycerin-soluble by-products of the culture medium. By it high fever and general toxic reactions are avoided and the course of treatment shortened by virtue of the more rapidly ascending dosage as compared with other tuberculins. The initial dose should be 0.02 milligram, increased in geometrical progression twice and later once weekly, if there be no contraindications, until the patient has received his individual maximum dose—this may be several hundred or only a fraction of a milligram—when if deemed necessary after an interval of a month or two the course of inoculations may be repeated. Similar principles govern inoculations with "B. E.," "O. T.," "T. R.," and "B. F." With these tuberculins, however, the initial dose must be much smaller, namely, 0.0001, 0.001, 0.0001, and 0.001 respectively. A few clinicians in recent years have recommended triturates of "T. R." and "B. E." for oral and emulsions of the same or suppositories of "O. T." for rectal administration. Too much emphasis cannot be laid upon the danger attending the employment of any tuberculin in incompetent hands.

The various forms of tuberculosis in which tuberculin has proved useful, if not curative, comprise pulmonary, genito-urinary, bones and joints, intestinal, peritoneal, laryngeal, ocular, mastoidal, and lymph nodal. In most sanitaria tuberculin is routinely employed in selected cases, namely, afebrile patients, where a commencing infection may be aborted or the course of a chronic *pulmonary* process favorably influenced. Trudeau stated in 1907 that during the past fifteen years the post-discharge mortality of patients from the Saranac Sanitarium was 18 to 25 per cent less with tuberculin treated than non-treated cases. Certain forms of genito-urinary tuberculosis are treated beneficially with tuberculin. These include *bacillary tuberculous nephritis,* where both kidneys are functionally sufficient but the primary or more affected kidney is indeterminable; bilateral, functionally insufficient, hence *inoperable tuberculous kidneys;* secondary *ureteritis* and *cystitis* following nephrectomy for tuberculosis; and primary or secondary *epididymitis, prostatitis, seminal vesiculitis,* and *salpingitis.* Exact discrimination must be exercised in the latter conditions as to whether the tuberculin syringe shall precede or follow the scalpel. Perhaps the best results in tuberculin immunization have occurred in the treatment of *chronic osteitis* and *arthritis.* Frequently there is a superimposed mixed infection in these cases, calling for the preliminary employment of autogenous bacterins; repeated cultures become necessary to identify the changeable pyogenic bacteria. In acute osteomyelitis and arthritis tuberculin therapy should be condemned. *Intestinal* and *peritoneal* tuberculosis offers little promise for tuberculin. I have experienced remarkable results using tuberculin following exploratory laparotomy revealing extensive nodular tuberculous peritonitis, and I have seen equally bad cases recover without tuberculin after simple laparotomy. Tuberculous *laryngitis* is nearly always associated with pulmonary involvement, and tuberculin has attained but indifferent success, although a few observers have reported excellent results. It would appear that the association of local treatment is a most important part of the management of this affection. Ocular tuberculosis includes *chronic conjunctivitis, phlyctenular* and *interstitial keratitis, iritis. iridocyclitis,* and *retinochoroiditis,* and seems to be a field wherein the results of tuberculin therapy have been most happy. Remarkable results have been obtained with "B. E." and to a less extent with "T. R." Old tuberculin seems to be definitely contraindicated in all ocular affections. *Chronic mastoiditis* at times has responded brilliantly to tuberculin immunization. Again, when the inoculations have been without effect, operative intervention has revealed carious bone. Tuberculin therapy in *chronic cervical lymphadenitis,* in the absence of indicated lymphadenectomy—that is, when the nodes have undergone marked caseation or liquefactive necrosis—and particularly following the removal of diseased tonsils and adenoids, has enjoyed considerable suc-

cess. "T. R." seems to be the preferable variety of tuberculin in this form of tuberculosis. The results of tuberculin therapy alone in lymphadenitis show that 60 per cent are markedly improved, and that 25 per cent of these will be cured, while 25 per cent will show only slight improvement and 15 to 25 per cent be failures. The best results will be obtained in children under the age of six.

DISEASES OF SKIN AND SOFT PARTS.

This group, comprising acne, boils, carbuncles, subcutaneous abscesses, ulcers, cellulitis, impetigo, sycosis, sinus, fistula, glanders, actinomycosis, smallpox, and bubonic plague, by all odds, furnishes the most fertile field for bacterial inoculations, therapeutically and prophylactically.

Acne.—Extraordinary results have followed bacterin therapy in this disease, especially in the pustular variety, when usually the M. albus and occasionally the M. aureus have been isolated. Incipient or non-pustular acne, according to Sabouraud, caused by the B. acne, in many cases is favorably influenced by inoculations with this organism, although the results are not nearly so constant or brilliant as with the staphylococci in the pustular form of the disease.

Furunculosis and Carbunculosis.—None the less remarkable are the effects of bacterial inoculations in these common affections. The infecting bacterium is almost invariably the M. aureus. In the case of the acute primary boil or carbuncle bacterin therapy need not and should not be used except by an expert possessing a knowledge of the opsonic index, since more harm than good may result, whereas in the chronic recurrent form of the disease it is the most valuable form of treatment at our disposal. Here again opsonic indices utilized to guard against overinoculation and to govern remote inoculations will suffice to prevent recurrences.

Subcutaneous Abscesses.—These may be primary or complicate other diseases, as typhoid fever. The bacteria isolated are M. aureus, albus and citreus, streptococcus pyogenes, pneumococcus lanceolatus, B. pyocyaneus, B. coli, B. typhosus, B. tuberculosis, B. anthracis, B. mallei, streptothrix actinomyces. An autogenous bacterin is always preferable to a stock preparation, and the therapy when so conducted usually results brilliantly.

Ulcers.—A variety of bacteria have been identified, the majority of which in chronic and intractable cases arise as secondary infections, against which bacterins may possess little material virtue unless the primary infection can be influenced. In addition to any of the common pyogenic bacteria, the following should receive consideration: B. tuberculosis, treponema pallidum, B. fusiformis, B. punctatum, and certain corynebacteria. In the treatment of rapidly spreading phagedenic ulcerations, excellent results have been obtained. Naturally, autogenous preparations should be utilized whenever possible, and cultures repeated frequently, as the bacterial flora are subject to change.

Cellulitis.—Under this heading are included *erysipelas, Ludwig's angina,* and the common *diffuse superficial dermatitis* at times associated with *lymphangitis* and *lymphadenitis.* The preponderant infecting organism is the streptococcus, although the staphylococcus is also found. Streptococcal infections of this class, in the acute stage, run a short course immeasurably influenced by bacterins; in the subacute, chronic, and recurrent stages bacterial inoculations have proved of immense benefit, at times performing the incredible.

Impetigo and Sycosis.—The invading microbe may be either the staphylococcus or streptococcus, consequently culture and the appropriate autogenous bacterins should be employed. In impetigo the result is uniformly successful; in sycosis, treatment, ofttimes prolonged, should result in 50 per cent of cures, the remainder showing improvement.

Sinus and Fistula.—Various bacteria, including staphylococcus, streptococcus, B. coli, B. proteus vulgaris, B. pseudo-tuberculosis rodentium, B. tuberculosis, B. pyocyaneus, B. fluorescens, B. lactis aërogenes, etc.,

have been found. The results in fistulæ have been unsatisfactory; in sinuses, if no surgical indications exist and hyperemia is used to facilitate the effectiveness of therapy, bacterins and tuberculins in many cases have possessed accessory value. My experience with pyocyaneus, fluorescens, and lactis aërogenes bacterins in any condition has never been glorifying.

Actinomycosis and Glanders.—Actinomyces may involve the lungs, liver, bones, or subcutaneous tissues. Actinomycotic inoculations in the pulmonary and hepatic forms of the disease are of little or no value. Actonomycotin, standardized so that one cubic centimeter contained one milligram of the sterilized powdered organisms, I have found beneficial in superficial localized lesions, using an initial dose of 0.001 milligram. Mallein has been attended with indifferent success, and in a generalized infection of glanders offers no promise of cure whatever.

Variola.—Vaccination against smallpox—the classical example of the prophylactic employment of a bacterin—is an achievement for mankind requiring no discussion in medical councils. Recently, autogenous staphylo-bacterins have been prepared from the pustules of variola and successfully used in diminishing the degree of cutaneous pitting.

Bubonic Plague.—Treatment with bacterins composed of the B. pestis has been extensively practiced by Haffkine. Prophylactic inoculation has reduced the mortality from 66.6 to 16.6 per cent in the experience of Strong, who employed living attenuated bacilli. Therapeutically, the attacks are much reduced in severity and recovery always occurs if the victim be a European. Curatively, however, Yersin's serum supersedes bacterin as a therapeutic agent. Bacterins are probably valueless in the septicemic and pneumonic forms of the disease.

DISEASES OF THE GENITO-URINARY SYSTEM.

Pyelitis, Pyelonephritis, and Cystitis.—Bacterins from the following microörganisms have been of service in certain diseases of the kidney and bladder: B. coli, B. tuberculosis, B. of Friedländer, B. typhosus, streptococcus pyogenes, staphylococcus, and M. lanceolatus. Great discrimination must be exercised as to whether the particular condition is amenable to bacterin therapy or should be operated. Bacterins were never intended to supplant surgery, but at times are wonderful accessory agents in promoting cure, and not infrequently, with proper administration, relieve surgery of some of its indications. In colon bacillus infections of the bladder and kidneys in children, autogenous bacterins have been signally meritorious. In these deep-seated affections estimations of the opsonic index to control the inoculations have been invaluable.

Urethritis.—The predominant germ is the gonococcus. Occasionally a non-specific infection arises due to the M. catarrhalis or other pyogenic bacteria. Although certain investigators have reported favorably on the value of gonococcus bacterin in acute gonorrhea, consensus of opinion does not favor its use.

Prostatitis and Seminal Vesiculitis.—The writer believes that these conditions in addition to the gonococcus are commonly precipitated and perpetuated by a mixed infection, as the streptococcus, colon bacillus, staphylococcus, pneumococcus, M. catarrhalis, or B. pseudo-diphtheriæ. He has obtained in many instances gratifying results by alternating a decivalent gonococcus stock and autogenous bacterins, the latter prepared from urine cultures after massage of prostate and seminal vesicles. The therapy has been conducted only in the subacute nd chronic cases, preferably in the presence of suppurative inflammations.

Epididymitis.—Gonococcus bacterin is probably of value in acute epididymitis, although the disease is prone to run a definite short course with proper treatment in the absence of immunotherapy. It would appear, however, that the employment of bacterin diminishes the likelihood of a resultant inflammatory nodule of the epididymis, at the same time reducing the liability to sterility. In the chronic form due to tuberculosis, tuberculin is of unquestionable value, both diagnostically and thera-

peutically, although in no small number of cases epididymectomy must be performed.

Vulvovaginitis.—In children inoculations of a polyvalent gonococcus bacterin in the acute stage have resulted brilliantly, causing the early disappearance of the gonococcus and shortening the usual course of treatment by months. Five million gonococci constitute the average dose, and from three to a dozen inoculations are necessary. Benefit is also observed from autogenous bacterins in the chronic form of the disease due to other pyogenic bacteria, as the streptococcus, staphylococcus, pneumococcus, and colon bacillus.

Metritis, Endometritis, and Salpingitis.—The following bacteria have been isolated: M. gonorrhœæ, B. coli, pneumococcus, streptococcus, staphylococcus, and tubercle bacillus. The results of bacterin therapy have been very indifferent, scarcely warranting the procedure.

DISEASES OF BONES AND JOINTS.

Osteitis, Periosteitis, and Osteomyelitis.—Infections from the following bacteria come into consideration: staphylococcus, streptococcus, pneumococcus, gonococcus, typhoid bacillus, colon bacillus, and tubercle bacillus. In the acute stage of an osteoperiosteitis, if bacteriemia is not present, bacterin therapy is very beneficial, especially in pneumococcic, gonococcic, typhoid, and colon infections; in chronic cases it is even more meritorious, if caries and sequestra are excluded and hyperemia used to augment the therapy. In my experience bacterins and tuberculins have done more harm than good in acute osteomyelitis.

Synovitis and Arthritis.—In the acute stage the streptococcus rheumaticus, gonococcus, pneumococcus, streptococcus pyogenes, and staphylococcus should be mentioned. Bacterins compiled from the first named organism, whether isolated from the joint, gums, tonsils, or feces, have in a number of instances rendered therapeutic service in the acute, subacute, and chronic forms of disease. I have never observed any remarkable benefit with the employment of the common pyogenic streptococci and staphylococci. On the other hand, this is a field wherein gonococcus bacterin enjoys much distinction. Indeed, biological inoculations furnish the treatment *par excellence* for gonorrheal synovitis and arthritis. It should also be observed in this connection that gonococcus bacterin is of exceptional value in the differential diagnosis of many obscure joint and other gonorrheal afflictions, used precisely as is tuberculin in a diagnostic capacity. Recently European investigators have lauded Bruck's "Arthigon" administered intravenously, claiming that the reaction evoked is specific diagnostically and invariably constant in gonorrheal subjects; it has also been extensively utilized therapeutically.

DISEASES OF EYE, EAR, NOSE, AND THROAT.

Singularly, perhaps, but nevertheless fortunately, infections of the eyes have, in the majority of instances, demonstrated the great value of bacterin therapy; not so much can be claimed in the treatment of diseases of the ear, nose, and throat. There are definite anatomical facts explanatory of these variable effects.

Conjunctivitis and dacryocystitis.—The following bacteria have been isolated: pneumococcus, streptococcus, staphylococcus, gonococcus, M. catarrhalis, Friedländer's bacillus, Koch-Weeks bacillus, Morax-Axenfeld bacillus, and tubercle bacillus. In many acute infections, notably that due to the bacillus of Koch-Weeks, the usual ophthalmological treatment will prove all-sufficient, while in chronic types, as that caused by the bacillus of Morax-Axenfeld, frequently little response follows ordinary treatment and the effect of bacterins appears to be specific. Between these are a number of infections, due to the gonococcus, pneumococcus, streptococcus, etc., which may do well with ordinary measures, but in which the accessory employment of bacterins hastens convalescence, diminishes the inroads of the pathological process, prevents sympathetic ophthalmia, and avoids the loss of vision. In dacryocystitis bacterin therapy may obviate surgical extirpation of the lacrimal sac.

Corneal Ulcer and Hypopyon.—The diplococcus pneumoniæ, the streptococcus mucosus, the streptococcus pyogenes, the staphylococcus and tubercle bacillus have been identified. Autogenous bacterins prepared from the pneumococcus and streptococcus in cases of ulcus serpens of the cornea, with and without hypopyon, notably in one instance in which panophthalmitis threatened complete destruction of the eye, have produced incredible results.

Iritis and Uveitis.—Here as in corneal ulcer the same organisms are found at work. If the infecting bacterium be determinable, the results are invariably excellent; especially noteworthy is bacterin therapy in gonorrheal affections.

Otitis Media and Mastoiditis.—An extensive array of bacteria, as streptococcus, staphylococcus, pneumococcus, colon bacillus, B. proteus vulgaris, B. lactis aërogenes, B. pyocyaneus, B. fluorescens, B. diphtheriæ and pseudo-diphtheriæ, M. catarrhalis, B. influenzæ, B. typhosus, and B. tuberculosis, have been found. Due to the fact that in the majority of cases the cultured organism is a secondary infection, also that the infected area is encased by bony walls limiting the supply of blood, although highly opsonized, the results of bacterin therapy have been poor in all save possibly acute cases.

Rhinitis and Sinusitis.—The bacterial flora of the nasal passages and associated sinuses differ little from those of the auditory apparatus. The results following the use of bacterins, however, are much better, due probably to the greater vascularity of the parts affected. Indeed, in suppurative sinusitis the employment of autogenous bacterins constitutes the sheet-anchor in treatment. The dosage, however, frequently must be increased over the average, reaching occasionally into the billions.

Laryngitis and Tracheitis.—The following bacteria are commonly demonstrable: M. catarrhalis, D. pneumoniæ, streptococcus pyogenes, staphylococcus, M. paratetragenus, B. diphtheriæ, B. influenzæ, and B. tuberculosis. Occasionally, excellent results have attended the use of bacterins in these affections, particularly with the M. catarrhalis, the pneumococcus, the streptococcus, and the staphylococcus. The treatment of "diphtheria carriers" by bacterins offers a promising field.

Scarlet Fever.—Opinion has grown to the effect that if the streptococcus is not the cause, it is materially concerned in the pathogenicity of the complications of scarlatina. Experience has shown that bacterins of the streptococcus conglomeratus, although having little effect curatively in the acute course of the disease, have unquestionably influenced the complications, as angina, lymphadenitis, nephritis, and otitis. Most remarkable are the prophylactic inoculations used in Russia, where in thousands of cases specific immunity has been secured, on the average, for eighteen months.

Hay-fever.—An allied treatment by antigenic inoculations is that of hay-fever by injections of the extracted pollen of ragweed, on the assumption that this affection is a pollen toxicosis. Such treatment has been applied therapeutically, as well as prophylactically. It is, however, of such recent date that no definite conclusions should be drawn. It may share the same fate as Dunbar's "pollantin" used to produce passive immunity in pollenosis.

DISEASES OF LUNGS.

Bronchitis.—The following bacteria may be identified: M. catarrhalis, M. paratetragenus, B. influenzæ, streptococcus, staphylococcus, B. typhosis, B. coli, D. pneumoniæ, Friedländer's bacillus, tubercle bacillus, and streptothrix actinomycosis. Pulmonary diseases offer an exceptional field for bacterin therapy, owing to the unusual vascularity of the tissue, permitting the opsonins to become effective. Consequently brilliant results are achieved routinely both curatively and prophylactically. This, of course, does not apply to tuberculosis and actinomycosis nearly to the degree that it does to other infections.

Pneumonia.—Essentially the same bacteria are to be found as in bronchitis. Keen discrimination must be exercised not to employ bacterins if there exists a doubt of

bacteriemia. The opsonic index here as in bronchitis should be utilized to secure the best results. In unresolved pneumonia and bronchopneumonia of childhood a special field of usefulness is offered autogenous bacterins.

Purulent Bronchiectasis and Pulmonary Abscess.—The bacteriology differs in no respect from that of bronchitis and pneumonia. The expectoration must be cultured and recultured frequently for the preparation of the correct autogenous bacterins. The opsonic index will render service in the proper management of the case. Although some benefit attends the use of bacterins, the results are not brilliant owing to the poor drainage in these chronic conditions.

Whooping-cough.—Although the bacillus of Bordet-Gengou is generally admitted to be the cause of pertussis, early in the attack, even before the second week, other bacteria, as M. catarrhalis, B. influenzæ, pneumococcus, and streptococcus, complicate the infection. Sufficient data have been gathered to demonstrate the value, prophylactically and therapeutically, of mixed bacterins in this disease. Indeed, the attacks have not only been ameliorated but the period of convalescence shortened fifty per cent.

DISEASES OF ALIMENTARY SYSTEM.

Pyorrhea Alveolaris and Tonsillitis.—The organisms usually found include the pneumococcus, streptococcus, staphylococcus, M. catarrhalis, spirochætæ, vibrios, and tubercle bacillus. The results of bacterin therapy have not been such as to recommend its adoption in these diseases.

Enterocolitis.—Exclusive of typhoid fever, dysentery, and cholera, the bacteria demonstrable in this condition, and more particularly mucous colitis, are the colon group, the streptococcus, the pneumococcus, the B. pyocyaneus, the B. acidi lactici, and rarely the bacillus of Friedländer. Bacterin therapy, especially using autogenous suspensions of the first three named organisms, has in many cases been productive of good results. The initial dose had best be smaller than the average, and here the utilization of the opsonic index as a control of treatment will prove serviceable. In not a few cases no material benefit has followed the use of bacterins.

Typhoid Fever.—Inasmuch as the lesions of the intestines stand out conspicuously in the pathology of this disease and are the organs first concerned by the invading microbe, the B. typhosus, it may be permissible to discuss its therapy under this heading. In the first place, it will be recalled that not infrequently by bacteriological study the fever will be found to be due to an organism closely allied to the bacillus of Eberth, namely, the B. paratyphosis A or B, or the paracolon bacillus, hence the advisability of employing autogenous bacterins if this disease is to be treated, biologically, in its acute stage. Although a number of observers have reported favorably both as to mortality and relapses, it is doubtful if bacterial inoculations in the acute course of the disease will ever be extensively practiced, due to the fact that after the first two or three days a bacteriemia supervenes, enduring for a number of days or weeks. In ten days or two weeks after the bacilli are no longer demonstrable in the blood, the expert administration of typhoid bacterin may result advantageously.

The bacterin treatment of "typhoid carriers," whether the infection lurk in the gall-bladder or urinary tract, has at times resulted brilliantly, at others failed.

Antityphoid inoculation stands out as one of the particular bright lights in bacterial therapy. In many of the armies of nations, adopting prophylactic inoculations, the freedom from typhoid fever has been remarkable and the figures need no repetition. It is alleged that full immunity persists for two years. In the American army doses of 500,000,000 and 1,000,000,000 dead bacilli are given at intervals of nine days. Were the practice universal, typhoid fever would soon cease to exist.

Dysentery.—Bacterin therapy concerns only the bacillary type of this disease. Closely allied bacilli have been described by Kruse, Shiga, Flexner, Hiss, and Strong. Bacterial inoculations, employing mostly the

Kruse-Shiga type of organism, have been extensively used in all save the acute gangrenous form of the disease, with the result that the mortality has fallen from 6.3 to 0.9 per cent. It should be noted that in acute cases bacterin therapy is contraindicated from the fourth to the twenty-first day. During this period Kruse and Shiga's antiendotoxic serum should be administered in full doses.

Cholera.—Bacterin therapy in this disease is limited entirely to preventive inoculation; it is valueless in a curative capacity. Since the introduction of prophylactic inoculations with the vibrio choleræ, the incidence of the disease, in a study of thousands of uninoculated and inoculated cases, has fallen from 3.6 to 0.66 per cent.

DISEASES OF CARDIOVASCULAR AND NERVOUS SYSTEM, ALSO OTHER ACUTE SPECIFIC FEVERS.

Bacteriemia, Septicemia, etc.—It is my belief, for reasons previously stated under "Contraindications," that bacterial inoculations, in these conditions, are not only valueless but harmful, and should the patient recover he does so not because of but in spite of bacterin therapy.

Endocarditis.—The streptococcus of the mitior or viridans, fœcalis or salivarius and pyogenes longus types, the pneumococcus, staphylococcus, gonococcus, and B. influenzæ are held to be the responsible infective bacteria. The results of bacterial inoculations have been far from promising, although a few successes have been reported in the chronic and even in the subacute forms of the disease. Treatment in this disease, if conducted at all, must be with the utmost caution. In the acute form it is certainly condemnable.

Rheumatic Fever and Articular Rheumatism.—The streptococcus rheumaticus is accepted in many quarters to be the causative organism. The results of Buchanan in the acute stage of these affections and those of Veitch in the chronic form, where entirely satisfactory results were obtained in 50 per cent of cases treated, are worthy of consideration, but as yet have not been duplicated by confirmatory investigation.

Malta Fever.—The M. melitensis is the offending bacterium. Although the writer has had no experience, it is claimed on good authority that small doses in the acute stage and larger dosage in the chronic stage have been followed by undoubted benefit in the treatment of this disease.

Hydrophobia.—Although the exact nature of the invading microörganism has not been definitely decided, antirabic inoculation as suggested by Pasteur is so well known that it needs no commentary. Allusion, however, should be made to the more recent work of Semple, who has prepared an efficient vaccine, essentially a bacterin, from the medullas of rabbits, which will keep for long periods and is constantly ready for use, thereby obviating the elaborate methods of Pasteur.

MALIGNANT NEOPLASMS.

All attempts to produce an efficient tumor extract or emulsion for the treatment of carcinoma and sarcoma have proved futile. A few years ago Doyen proclaimed the specificity of the micrococcus neoformans in the etiology of cancer. This organism is undoubtedly an accidental invader, and to the best of my knowledge no case of carcinoma has been or will be cured by the agency of neoformans bacterin.

Coley's treatment of sarcoma is worthy of mention. Coley's fluid, so-called, is a mixed bacterin of the streptococcus of erysipelas and the bacillus prodigiosus. It is indicated: (1) in all cases of inoperable sarcoma; (2) for two or three weeks even in operable cases, if there be a chance of saving a limb—that is, when the giant-celled type of tumor exists; (3) as a prophylactic against recurrence after operation; and (4) postoperatively, against carcinomatous recurrence. Apparently a large number of properly selected cases have been cured by administering daily inoculations, starting with one-quarter minim in the gluteal or pectoral region, and increasing the size of the dose one-quarter minim daily until a reaction is evoked. The dosage must not be

increased and may have to be diminished on the supervention of reaction. It is recommended that the inoculations be made alternately in the tumor and elsewhere. The initial tumor injection should be only one-quarter of the previous inoculation into the gluteal or pectoral region.

YEAST AND SOUR MILK.

Brewer's yeast (saccharomyces cerevisiæ) has been a popular remedy in the treatment of furunculosis. In many cases it appears to be without effect, and to-day is being supplanted by staphylococco-bacterins. The employment of yeast in tuberculosis and cancer has been a failure.

Metchnikoff observed that the peasants in certain parts of Bulgaria, whose staple diet consisted in the consumption of peculiar soured milks, lived to an advanced old age. A peculiar lactic bacillus, the B. bulgaricus or bacillus of Massol, was shown to be the effective organism. Accordingly, the ingestion of sour milk has become a world-wide practice in the hope of avoiding senility, correcting putrefactive intestinal processes and a host of other affections. Obviously, the results have not measured up to expectations, although benefit seems to have attended the administration of artificially prepared soured milk in many cases.

THE PESSARY.[1]

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The pessary, an ingenious device for mechanically holding the uterus in place, the use of which say thirty-five years ago was the sole method for the treatment of uterine displacements, has suffered a temporary neglect for three reasons: (1) Because of the unfortunate consequences attending its reckless application when positively contraindicated, by those unfamiliar with its use and application; (2) because in many cases the pessary fails to cure; and (3) owing to the development of multiple operations and brilliant surgery.

It is now regaining its position to some extent, and the indications for its use are better understood and are upon a more scientific basis. One writer has said that the day of the pessary is over, but I believe that it will be used more frequently as the rank and file of the profession come to understand more clearly the principles of its action.

The object of the pessary and the manner of its adjustment appear to be imperfectly understood by possibly the larger portion of the profession, hence the evil accruing from its use probably has overbalanced the benefits that have been derived.

It would be very hard to enumerate the number of pessaries, modified pessaries, and uterine supports that have been devised, employed, and many of them abandoned, since the time of Hippocrates, who used pieces of sponge, or balls of wool, soaked in medicated substances, in the form of a ball or tent. As Reed states, "the shops abound in patterns, the grotesque shapes of which would seem to have exhausted ingenuity."

"It has been said that it requires a high order of mechanical skill, and an intimate knowledge of the pelvic mechanism, to adjust a pessary. This in a large measure is true, for it is impossible to adjust a pessary too nicely, and there are infinite shades of variation in the pelvis and its contents, which only can be met by mechanical instinct. Nevertheless, much good work can be accomplished by any one of ordinary mechanical ability who will acquaint himself with the cardinal facts" (Dudley).

No one can safely apply the pessary until

[1]Read by invitation before the Academy of Medicine, Harrisburg, Pa., September 25, 1914.

he has fully appreciated its indications and contraindications.

The *indications* for the use of the pessary may be considered as follows: The use of the pessary chiefly is to remedy, prevent, or alleviate some form of displacement of the uterus or vaginal walls, or both. Tampons also are used for this purpose, but pessaries are more effective, for the reason that they can be retained in place for a long time, are less likely to be displaced, and exert a more continuous influence. There are conditions, such as disease of the heart and kidneys, Graves's disease, leukemia, etc., which make unjustifiable any operations but those that are urgently necessary. Such patients can be treated only with a pessary. It also must be used in women who will not, or as stated should not, be operated upon. In the large majority of all cases of retroflexion of the uterus which follow childbirth, a pessary usually is required temporarily. All cases of parturition should be examined at the beginning of the fourth week; if the uterus is retrodisplaced, replace it. Some advocate the use of the pessary at this time, others wait until the end of the sixth week before its introduction. Gottschalk advises the use of a pessary as early as the seventh day after delivery, the patient being kept in bed three or four weeks. The patient is examined again at the end of the eighth and twelfth weeks, and if the uterus still maintains its normal position, the pessary is removed, and the patient dismissed cured. By lifting the uterus in the pelvis with a pessary, the strain is removed from the ligaments, the process of involution is facilitated and continued until their sustaining power has been regained. However, in chronic cases of long-standing displacement, the process of involution cannot be inaugurated, so that the normal position of the uterus is maintained only as long as the pessary is worn.

Following the puerperium, if after appropriate treatment for a period of at least eight weeks the uterus will not remain in good position without support, patients should be offered the choice of radical cure by operation, or the indefinite use of a pessary. If they understand clearly that at any time they may be radically cured, and nevertheless deliberately choose the indefinite use of a pessary, naturally they are entitled to select the course they prefer. It is a confession of weakness on our part, all things being equal, if we cannot make such patients perfectly comfortable with a pessary. Operation is the only method which holds out prospect of cure in cases complicated with lacerations, an enlarged uterus, or much prolapse; in other cases in which the uterus is small, when symptoms have been present but a short time, and particularly if they are associated with neurasthenia, treatment by pessary in some cases will result in a cure. Even when a cure cannot be hoped for by pessary, its temporary use often is of value in relieving symptoms, and in aiding to restore the general health.

A pessary should be introduced during pregnancy only to obviate the recurrence of a retrodisplacement or prolapsus of the uterus, or to prevent its incarceration. Some authors advocate its use under these circumstances only until the end of the third month of gestation. In the long run, however, it may be considered the best procedure to allow the pessary to remain until the end of the fourth month. Should a woman become pregnant while wearing a pessary, the same rule obtains.

Contraindications.—They are displacements associated with perimetritis, parametritis, those complicated by adhesions, adnexal tumors, inflammations of the tubes and ovaries, hydrosalpinx, pyosalpinx, hematosalpinx, and neoplasms or masses in Douglas's cul-de-sac. A pessary should never be used in the presence of any intrapelvic lesion in which the upper bar of the pessary would come in contact with, or exert pressure upon, the ovaries or tubes; thus if the ovary is prolapsed, unless it moves out of harm's way when the uterus is replaced, a pessary if introduced would impinge the ovary between the upper bar and the hollow of the sacrum, with its consequent train of symptoms. All inflammations must be allayed before a pessary is introduced; if not, under these conditions the presence of a

pessary would be so painful as to contraindicate its employment. If a tumor is the cause of the displacement, the downward force may be greater than any pessary can counteract, hence the neoplasm must be removed. By laceration, subinvolution, or other cause, the pelvic floor may be so relaxed that it will fail to give a pessary the necessary support. This is a very important point, as too often patients wearing a pessary are seen with the pelvic floor so badly lacerated that it failed to support the instrument, hence receiving no results from its employment.

The pessary, while so strongly condemned, often has been used in those cases which distinctly contraindicate its employment. Dudley truly says: "The pessary must be restricted to those cases in which the displaced organs are reducible, in which the pessary is capable of holding them in place, and can be worn without discomfort. Failure to recognize and appreciate the contraindications accounts not only for the failure and the disappointments, but also for the many evil results which have followed the indiscriminate attempts to treat all displacements by mechanical support. The exclusion of unsuitable cases and the recognition of the necessity for accurate diagnosis are apparent. The pessary, according to the knowledge, judgment, and mechanical skill of the practitioner, will be useful, useless, or injurious."

In this regard the following case history will appeal to you:

M.W., aged thirty-five, married seventeen years, never been pregnant, puberty at eleven, had her menses regularly, and until about a year before the history was taken had marked dysmenorrhea. Two months after her marriage she was confined to bed for several weeks with "womb trouble," since which time she has been a constant sufferer. Has an acrid discharge, which is markedly irritating. For the past seven years she has had bearing-down pains referable to the vagina, and complains of occipitocoronal headache, lumbar pains, dysuria, and dyspareunia. During menstruation the pelvic symptoms are all relieved. Bowels slightly constipated. She had been under the care of three physicians as follows:

No. 1 told her that the womb "had fallen forward." Tampons were employed for two weeks, then a pessary was tried for a couple of weeks.

No. 2 said: "You have falling of the womb." He tried tampons for over a week, and then resorted to the pessary for several days.

No. 3 tabooed the two previous diagnoses, and said: "Your womb is turned back on itself." Tampons were resorted to for a week, and the pessary for two weeks.

In each instance the presence of the tampon was so painful that she was compelled to remove it within a few hours. The pessary also proved to be exceedingly painful, and could not be worn, although each physician urged her to continue its use, assuring her that she gradually would become accustomed to it.

Upon making a simple vaginal examination, a mass could be felt in the anterior fornix, and one in the posterior. A satisfactory bimanual examination could not be made on account of the pain, the straining incident thereto, and a thick abdominal wall. Under ether anesthesia the masses were diagnosed as fibroids, the fundus easily palpated midway between the two. One physician had evidently mistaken the fibroid in the anterior wall of the uterus for the fundus, and treated her for an anteflexion. Another had made the same mistake posterior to the uterus, treating her for a retroflexion, the one overlooking the neoplasm posteriorly, the other the one anteriorly. The third one overlooked both, and thought that a simple prolapsus was present, when in reality the uterus was fixed in the position which it occupied.

This case serves well to illustrate that a careful bimanual examination always should be made, under ether if necessary, to ascertain the true nature of the pelvic contents.

The Pessary.—Pessaries ought always to be made of hard rubber. Aluminum is a good material, but expensive. No soft-rubber pessary of any kind should ever be used. They become indescribably foul in a

day or two, provoke a vaginitis, and have produced septicemia.

The best models of the so-called "lever" pessaries are the Smith, the Hodge, and the Thomas-Mundé; and, in addition, the common hard-rubber ring, the Gehrung, and the Menge. "Owing to its shape, if the uterus is tilted backward, pressure on the upper segment of the pessary will cause the lower end to move forward until it impinges upon the pubic rami, which prevents the further backward displacement of the uterus, and it soon returns to its normal position, when the pessary drops back into the vaginal axis. It is because of this movement, by which pressure on one end will throw up the other, that the pessary has received its name—lever pessary. Under ordinary conditions it requires but the slightest resistance on the part of the pessary to meet the backward movement of the uterus, when, responding to the conservative forces instituted by Nature for the purpose, it soon returns to its normal position. Thus, in the properly adjusted pessary there is neither severe nor sustained pressure at any point" (Gilliam).

All forms of instruments which obtain their necessary support from external straps are unsatisfactory, and in many cases injurious. This particular variety of support will be discussed more in detail later. For convenience, the curves of the "lever" pessaries (the first three mentioned) may be characterized as follows: The upper portion of the pessary, that curve which rests in the posterior vault of the vagina, as the uterine curve, and that which occupies that part of the vagina adjacent to the pubis, the pubic curve. The height to which the pessary will lift the uterus is determined by the acuteness and length of the uterine curve; the longer and more acute the curve, the higher the uterus will be lifted, and *vice versa*.

It is better to have a large assortment of different sizes and shapes than to attempt to mold a pessary to suit the individual case. The lever pessaries are used for maintaining the fundus forward in its normal position, in the treatment of retrodisplacements, and prolapse of the first, and even in some cases of the second, degree (that is, when the cervix presents at the introitus). The "ring" pessary meets the same indications. The Menge is used for prolapsus uteri, cystocele, rectocele, or both, and procidentia. The Gehrung pessary is limited to some cases of cystocele. Of all the pessaries mentioned, the ring pessary alone can be disinfected by boiling water, because it does not lose its shape. Any pessary which may lose its form by boiling may be disinfected by scrubbing with soap and hot water, and placed in a bichloride of mercury solution for a few days. A pessary never should be removed from a patient and, after a trivial washing or "rinsing," be inserted into another, as gonorrheal and other infections in this manner unwittingly have been transmitted.

The relationship between the pessary and coition is one that must be borne in mind, and the possibilities and impossibilities told to the patient or her husband. The simple lever pessaries do not interfere with coition. The Gehrung pessary does, although this is the one variety that may be removed and replaced by the patient. However, the use of the Menge, or the McIntosh or similar contrivances, does prohibit coition. There are women who will tell you of being fearful, if a pessary should be used that will prohibit coition, that their husbands may seek sexual congress elsewhere, having reason to anticipate such, and would prefer that some other form of treatment be employed. I know of a woman (sixty-five years of age) who had a marked prolapse that really indicated the use of a Menge pessary. When she was told that it would prohibit coition, she said that some other form of treatment would have to be used; that her husband (70 years of age) would object. You readily can see where an important issue is involved.

When dealing with a retrodisplacement of the uterus, care and precaution must be exercised that the fundus of the uterus is replaced to its normal position before the pessary is introduced. The function of the pessary is to maintain the replaced uterus in its normal position. Under no consider-

ation would a truss be applied before a hernia is reduced, neither would the hernia be reduced with the truss, but the hernia first would be reduced, and then the truss applied. Just so regarding the pessary and displacements.

Treatment Preparatory to the Use of a Pessary.—When attempts at replacement fail, and there is no evidence of pelvic adhesions, or of inflammatory involvement of the uterus, the failure may be due to rigidity of the abdominal wall, to a very fat abdominal wall, to sensitiveness on the part of the patient, or to an enlarged uterus. In the case of a non-adherent uterus, this organ may be so large that it fits more or less snugly in the hollow of the sacrum, and cannot be elevated past the sacral promontory. Or again, if there is inflammatory involvement, such as perimetritis, parametritis, salpingitis, ovaritis, etc., the same rule applies. Under such circumstances, the patient should receive the benefit of the so-called "local" treatment. The various methods of local or topical treatment consist in the use of (1) the tampon, (2) antiseptic and astringent applications, (3) vaginal douching, (4) high rectal injections, (5) pelvic massage, and (6) local bloodletting.

1. The vaginal tampon. The materials that may be used for tampons are absorbent cotton, sterilized gauze, and sterilized lamb's wool. The best material is sterilized lamb's wool covered with a layer of absorbent cotton; because it is non-irritating, its draining properties are good, it is introduced and removed with little or no difficulty, and it retains its resiliency, even when wet, longer than any other material. When this tampon is employed, the cotton becomes saturated with the medicament, "while the nucleus of wool within gives the required degree of elasticity or resiliency, and serves only as a perfect medium for drainage." Tampons are used to apply medicaments, and for mechanical reasons. The medicament may be applied for the relief of pain, absorption of inflammatory products, as a counter-irritant, or to contract relaxed tissues. Glycerin, owing to its dehydrating properties, is the best adjuvant to other drugs, and when combined with ichthyol, 15 to 25 per cent, its value will be markedly enhanced. Boroglycerin will be found very useful in many cases. Very often the mechanical effect of the tampon, by supporting the uterus, maintaining it in its normal position, relieves the congestion and pressure symptoms.

It is important to explain to the patient that a tampon has been inserted, as it is possible that she may not return for a second treatment, and the packing, undergoing putrefaction, may produce sepsis. Beckwith reports the case of a woman in whom a tampon had remained for twenty-nine years, it having been introduced by a midwife without the knowledge of the patient. The tampon in this case had become encrusted with lime salts, which gave rise to hemorrhage from the excoriated mucous membrane.

2. The antiseptic and astringent applications of value are numerous. Churchill's tincture of iodine may be applied to the cervix and vaginal vault with advantage. In eroded os uteri, a 10-per-cent solution of nitrate of silver or a 5-per-cent solution of sulphate of copper is indicated; acetic acid, to which 4 per cent carbolic acid has been added, may be poured into the speculum and allowed to act for several minutes, this procedure being repeated daily for a few weeks. The reddened ulcerated patches gradually disappear as the pathologic cylindric epithelium is replaced by epidermoid cells.

3. The vaginal douche may be of hot water or of hot antiseptic solutions. If the chief aim of the injection is to combat inflammation and cause absorption of inflammatory exudates, plain hot water is the best, the temperature of which should be at least 110° F. At least one gallon should be used at each treatment. The douche must be prolonged, in order to secure its secondary contractile effect upon the blood-vessels. Occasionally hot water increases the pain, and may be replaced by lukewarm water. Vaginal douches in chronic cases are used, as a rule, night and morning; a fountain syringe is preferable, and the patient should be in the recumbent posture on a douche

pan. For antiseptic douching, bichloride of mercury 1/4000, creolin, liquor cresolis comp., and carbolic acid are of value.

4. High rectal injections are useful, because the fluid is carried higher in the pelvis and exerts its influence on the intrapelvic structures more effectually than do simple vaginal douches. It also tends to relieve constipation, which is so frequently present in these cases of pelvic disease.

5. Pelvic massage, so earnestly advocated by Thure, Brandt, and others, has not proven satisfactory. Patients are unwilling to submit to the frequent and prolonged manipulations necessary to secure success by this method.

6. When the cervix is enlarged and congested, relief may be given by multiple punctures, made under antiseptic precautions, and the abstraction of a few drachms of blood. The depleting effect of such "surgical leeching" is decidedly beneficial.

Each time the patient comes for treatment, if an unreduced displacement is present, an effort should be made to push the uterus forward; in this way, very often the uterus can be "coaxed" forward into its normal position. If at the end of, say, six weeks' treatment the displacement still remains irreducible, the patient should be anesthetized and the question of adhesions definitely settled.

After the uterus has been replaced in its normal position, then arises the question of fitting a pessary.

The Fitting of a Pessary.—The patient preferably should be in the dorsal position; very rarely is it necessary to use the genupectoral posture. It must distinctly be borne in mind that the pessary should be fitted to the patient, and not the patient to the pessary, as many cases of failure are due to a careless selection of the pessary. In order to determine the length of the pessary, a pair of dressing forceps is passed, on the finger as a guide, to the top of the posterior vaginal vault, and a point is marked on the shaft of the forceps about one-half inch within the external meatus urinarius. In order to obtain the width, reintroduce the forceps to about the level of the cervix, and separate the handles until the blades of the instrument come in contact with the lateral walls of the vagina. Note the distance between the handles, then close the instrument and withdraw it. Then separate the handles to the extent noted, and the distance between the tips of the blades should correspond to the greatest lateral diameter of the pessary. The length also may be determined by introducing a finger into the vagina, and noting the distance from the posterior vaginal vault to a point one-half inch within the meatus; and the width is determined by introducing two fingers into the vagina, and determining the extent to which they can be separated without undue lateral pressure. By use of Barker's vaginometer, these measurements may be taken more conveniently.

In the fitting of all pessaries, with the exception of the Gehrung and the Menge, it is a golden rule that the forefinger should be able to pass fairly easy between the sides of the frame of the pessary and the vaginal wall at any part. In fitting a support, choose one that fits exactly, if possible, but if not, have it too small rather than too large. Too frequently one is tempted to insert a large pessary of the style which Kelly for many years has called a "horse pessary." This overstretches the vaginal walls, and too often leads to ulceration. If it is not too wide, but if it can be passed too easily, it will prove to be too narrow. Faults in length are usually estimated by the amount of projection at the lower end, which always ought to be posterior to the plane of the vaginal outlet—in other words, just out of sight. When introduced the pessary should be large enough to be well supported only by the soft parts, and take no bearing on the solid structures of the pelvis. A pessary properly adjusted in all other respects may, by pressure on the urethra and neck of the bladder, create vesical tenesmus and urethral irritation. This calls for an increase in the pubic curve—that is, the pessary should be bent away from the irritating part. In order to bend a pessary, and at the same time avoid destroying the polished surface, it should be

thoroughly greased (either vaselin or cosmoline may be used), and held just above the flame of an alcohol lamp or gas-jet, exercising care not to permit the grease to catch fire; should this occur the rubber will burn, leaving a rough spot which may irritate the mucosa.

A properly fitting pessary should raise the uterus to its normal level. Should the uterus be raised to a higher level, it may render tense the broad ligaments, and reproduce a condition which it was designed to relieve. On the other hand, some cases are rendered more comfortable by elevating the uterus to a plane slightly above its normal level, thus facilitating the drainage of passive congestion.

There are those who believe that the simple hard-rubber ring pessary will serve all purposes, and fill all indications better than the lever pessaries. Personally, I rarely use the ring pessary, because of the difficulty to have it maintain its proper position.

In the selection of a pessary for retrodisplacements, the Thomas-Mundé will be found most useful in the greatest number of cases. If one style of pessary does not afford relief, try out the others in turn. It must be borne in mind that in order to maintain a pessary at the proper level, it must have good support from the pelvic floor. Consequently, if a pelvic floor is so lacerated that it will not afford the proper support, then the use of a pessary is contraindicated. If the selected pessary is introduced, and the relaxed pelvic floor is not affording the necessary support, try a Hodge pessary with a broad lower end, as sometimes it will be retained.

In cases in which the anterior vaginal wall descends with greater force than usual and drives too low down an otherwise well-fitting pessary, it may be necessary to curve more forward the lower end. If this does not suffice, the patient should be instructed to wear a snugly fitting napkin, which will give counter-support from below.

Introduction of a Lever Pessary.—The patient is placed in the dorsal position. The uterus must be in perfect position before the pessary is inserted. The pessary should be lubricated properly, and should be inserted with the posterior bar in the oblique diameter of the vagina, so that a comfortable distention of the vaginal entrance is accomplished by using the opposite posterior and anterior sulci. A right-handed physician will find it easier to hold the anterior bar of the pessary between the thumb and index-finger of the right hand, and with the forefinger of his left hand press downward and outward the right posterior vaginal sulcus, insert the pessary almost upside down, rotating it after it has entered the vagina, and then with the forefinger of the right hand slipping the posterior bar behind the cervix. The pessary then should be wholly within the vagina, behind the symphysis, and no part visible at the vaginal outlet. A properly adjusted pessary should occasion no discomfort; its lower end should not be visible at the vaginal outlet; it should not "threaten" to fall out; it should not overdilate the vagina, but easily be rotated on its longitudinal axis; the fundus uteri should be in anterior position and the cervix posterior.

A pessary which is comfortable in the dorsal position may occasion distress in another posture. After its introduction, the patient should be allowed to walk around the office, and be seated; even more, she should be requested "to squat." If in all these postures the pessary still remains comfortable, then the patient may be permitted to leave the office, after instructing her how to remove the pessary should it give rise to pain. A woman very easily can introduce her index-finger in the vagina until she feels the anterior bar, then hooking her finger over it the instrument readily can be withdrawn. She should be shown a pessary in order that she may know its contour, when the demonstration of its removal may be made. If a pessary cannot be made comfortable, abandon its use.

Care of the Pessary.—Never introduce a pessary, tampon, or any foreign object in the vagina without explaining to the patient what has been done, and the subsequent care of it. The patient should be under observation the entire time she is wearing

a pessary. She should be examined within a week of its introduction, in order to ascertain if it is satisfactory in all respects. The acid reaction of the vagina varies greatly in different women, and after all is the important factor in determining the character, and frequency, of the cleansing douche, and the periods at which the pessary should be removed, cleansed, and replaced. The douches may be required daily, or every two or three days. The following may be used for this purpose: Creolin or liquor cresolis comp. 1 drachm to 2 quarts of hot water, or a teaspoonful each of bicarbonate of soda and borax in a pint of hot water. Under no consideration should a mineral astringent be employed for douching, with a pessary *in situ*, as it leads to the deposition of salts on the pessary, which roughen its surface, increase the irritation, and lead to further abrasion and ulceration of the vagina. The pessary should be removed, cleansed and replaced, every one, two, or three months, as the individual case warrants. If there is evidence of the surface being eroded, a new instrument should be inserted. At the same time the vaginal mucosa should be inspected, and if there is evidence of inflammation or ulceration the pessary should not be replaced until the mucosa has been restored to its normal condition, by appropriate treatment. It would be better under such conditions to use a pessary a size smaller than the one that had been worn. The patient should be instructed to return for examination whenever a pessary is giving discomfort. A pessary, even after being worn for some time, may at any time become displaced by a bowel movement, or during an unusual muscular action. A pessary may be removed for a few days not only to give the tissues rest, but to afford an opportunity to observe its effects.

Cause of Failure.—These may be attributed as follows: The uterine end of the pessary may be too short, and not maintain the uterus at the proper level to keep it forward; the uterosacral ligaments may straddle the uterine end of the instrument, rendering its action void; the instrument may be too small in every way, and slip down and out of the vagina; some persistent bands of adhesions may remain, and pull the fundus uteri back, notwithstanding the support of the pessary; the perineum may be lacerated so badly, or the introitus so markedly relaxed, that proper support from below will not be given to the pessary.

Dangers.—The pessary becomes injurious when it is too large, or when it is left in too long. There are numerous cases recorded of pessaries that have been removed twenty to thirty years after introduction, with no care or attention in the interim. Accidents happened far more frequently with our predecessors than at the present time. Long pressure of a pessary may produce vesicovaginal or rectovaginal fistulas; instances of ulceration, even into the peritoneum, have been reported. Atresia of the vagina also has occurred from the neglected long-continued use of a pessary. These accidents were due more frequently to the stem-cup pessaries, that had been acting for years as foreign bodies in the vagina. Excoriation of the vagina, leading to ulceration, may occur when pessaries are not removed regularly and properly cleansed. A patient may be inoculated by an unclean pessary, as detailed in the early part of the paper.

In a few instances primary carcinoma of the vagina has been observed to develop at the point of pressure from pessaries, especially where their long-continued use has caused ulceration. These cases have many points in common with carcinoma of the skin, which sometimes develops in the border of indolent ulcers. In the present state of our knowledge concerning the etiology of carcinoma, it is difficult to say just what influence the pessary has had as an exciting cause of the carcinoma, and we do not know whether the irritation following its use or the ulceration, by producing an avenue of infection, has been chiefly instrumental. Microscopically primary carcinoma of the vagina presents the characteristics of carcinoma growing from the skin.

Anterior Displacements of the Uterus.—Various instruments have been devised to elevate the antedisplaced uterus. Their

action, however, depends upon pressure along the anterior vaginal wall, producing more or less vesical distress, hence they are of little or no service, and practically have been discarded.

Cystocele.—When a good pelvic floor exists, and a cystocele is present, it may be corrected by the use of the Gehrung pessary. It can be removed and replaced easily by the patient. However, when not contraindicated, the Menge pessary is the best, especially in women of advanced years.

Rectocele.—Pessaries for rectoceles are not as a rule satisfactory, although some surprising results are obtained. Here again the Menge pessary must be considered. I saw a woman recently who had a fibroid that extended to the umbilicus, and also a large rectocele. The tumor was not giving rise to symptoms, but the rectocele was very annoying. Her attending physician introduced a lever pessary, which corrected the rectocele, and afforded the woman absolute comfort.

Prolapsus Uteri.—As tersely stated by Goodell, in the mechanical treatment of prolapsus uteri, the womb needs "shoring up;" on the other hand it must not be pushed up so high as to place the pelvic structures on the stretch. The happy medium between this upward stretching and downward traction is obtained by the use of the Menge pessary. The defects of all existing pessaries are removed by this instrument, and all cases of prolapsus of the uterus and vagina, whether inoperable or not, are happily treated by the pessary constructed by Menge. What is necessary in these cases is a ring which can be introduced into the vagina without any injury to the distended tissues, and yet be of sufficient size effectually to support the uterus and vagina in normal position, and be prevented by a peculiar mechanism from placing itself on edge, and which readily can be introduced and removed. The Menge pessary meets all these requirements. The new feature in this instrument, which he calls a club pessary, is that the ring and club are fastened together by a bayonet lock, by means of which both parts easily are separated and reunited so that they can be introduced separately in the vagina, and afterward they readily can be fastened together in their proper position. Thus one has gained the possibility of introducing a large ring edgewise through the introitus, and then above this, in the wider part of the vaginal canal, the club stem is attached to it and a permanent transverse position assured. One advantage of this form is that because of the round thick end of the club there is no fear of pressure necrosis of the vaginal wall; and secondly, through the increased size of the cone, the sidewise pressure is entirely controlled. The one instrument especially which has been discarded since the introduction of the Menge pessary is the McIntosh pessary, which consists of a stem pessary maintained by external attachments of rubber straps and an abdominal belt. This instrument holds the uterus in a fixed position, preventing its normal movements, or holds it in such a manner as to permit it to assume any one of the various malpositions. The rubber straps which are fastened to the belt front and back, passing in between the legs of the patient, are very objectionable features.

If the patient has a pendulous abdomen, and needs some form of support, the Storm binder will meet all requirements.

After the Menge pessary has been worn for some time, you will notice that there is a distinct bed in which the pessary is resting. You will be impressed with the fact that it rests in its new bed just as the valve stem of a gas engine "rests" in its seat. As a result of this making of a new bed, from time to time a pessary smaller in size will suffice.

It is clearly evident that a number of patients may obtain considerable relief by the use of these various local methods, when more radical procedures are inadvisable or impossible.

SERUM TREATMENT OF TETANUS: REPORT OF A CASE.[1]

BY EDWARD J. MEYER, M.D., LOUISVILLE, KENTUCKY.

As recovery from tetanus after the fully developed symptoms have appeared is rare the following report is of interest:

On Monday, May 18, 1914, there appeared at my office a man aged twenty-two years, who presented a lacerated wound upon the palmar surface of the left hand just below the wrist. The injury had been inflicted five days previously while the patient was operating a wood-cutting lathe. The wound had become infected, and the jagged edges of a flap seemed to conceal some fluid; but under the employment of moist carbolized dressings the slough soon disappeared and the wound thereafter granulated normally.

An especially noteworthy feature in connection with the case was that little pus was observed, nor did any unfavorable symptoms develop until ten days after receipt of the injury, when the patient complained of a "tightness around his chest, and slight difficulty in swallowing." A calomel purge followed by aspirin and phenacetine was ordered.

On Monday, May 25, the patient seemed to have slightly improved and nothing unusual was noted until the following Wednesday, fourteen days after the injury, when I was hurriedly summoned and found a considerable change in his condition. The patient was absolutely rigid, the abdominal muscles were exceedingly tense and hard; temperature 104° F., pulse 100, respirations labored. The facial muscles were markedly contracted, baring the teeth and causing that peculiar "grin" which is described in the text-books as characteristic of tetanus. I was informed that the patient had experienced a severe chill that morning; he was able to talk but little and with great difficulty; he could open his mouth only slightly, but enough to enable him to swallow liquids in small quantities.

While there appeared no question as to the correctness of my diagnosis, to be certain that there was no mistake I asked for a consultation, and Dr. John K. Freeman was called. After examining the patient he concurred in the diagnosis of tetanus. We tried to raise the patient into a semirecumbent posture in bed, but it seemed like handling a stiff, inanimate object on account of the general muscular rigidity present. He complained considerably of pain in his head, and stated that there "seemed to be a band of iron around his chest which was gradually becoming tighter."

That afternoon the patient was given 12,000 units of antitetanic serum. His axillary temperature was then 104° F., pulse 120. The following morning the chest pain was less severe, but the moment the patient was disturbed painful muscular contractions and general irritability supervened. That morning he received 10,000 units of the serum, and in the afternoon 15,000 more. At eight o'clock that night he seemed somewhat improved; temperature 102° F., pulse 100; muscular rigidity was not so pronounced, and became manifest only when the patient was disturbed.

The third day (Friday) he was given 25,000 units of the serum at ten o'clock in the morning, and 15,000 units in the afternoon. That night muscular rigidity was less perceptible, and the patient rested well. Saturday he received 15,000 units of the serum, 5000 in the morning, and 10,000 at night, followed by marked improvement. Sunday he was given 10,000 units, and with assistance he was able to assume a semirecumbent posture in bed without discomfort. There was only slight evidence of muscular rigidity, and the patient was fairly comfortable. On Monday he received 5000 units of the serum, the same quantity on Wednesday, and on Friday the last injection of 5000 units was given.

On the following Sunday, twelve days after the first injection of serum, and twenty-six days after the injury, the muscular rigidity had disappeared; the tempera-

[1]Clinical report before the West End Medical Society of Louisville, Kentucky, October, 1914.

ture was normal, pulse 88. Thereafter the patient's recuperation was rapid; his appetite increased and digestion improved. He still complained of general muscular soreness, but this gradually disappeared.

During the course of the serum treatment the patient received a total of 102,000 units of the antitetanic serum administered subcutaneously in the back and thighs. He suffered very little discomfort at the site of the injections.

Internally fifteen grains of chloral hydrate and fifteen each of potassium and sodium bromide were given every three hours, little difficulty being experienced in administration. After the first injection of serum the mouth could be opened sufficiently to permit the use of a hard-rubber tube, and by swallowing a small quantity of liquid at a time he did very well. A large dose of Epsom salt was also administered every day to secure free elimination. Liquid nourishment was given either just before or after administration of the medicine, so as to disturb the patient as little as possible. During the first four days after development of the serious symptoms the urine was highly colored, but later became normal.

During the period mentioned the wound was dressed every four hours with carbolized gauze, and when the dressings were changed the wound surface was bathed with peroxide of hydrogen in the hope that the liberated oxygen might be of some service.

In the treatment of this case, one feature was particularly noteworthy, viz., the marked improvement in the patient's condition following each administration of the serum, and after the first twenty-four hours he rested fairly well when not disturbed. He would awaken with a start at the slightest noise, but when handled gently could be aroused without difficulty or marked excitement.

While it is true that possibly 50 per cent of cases of chronic tetanus recover, this case, while not of the fulminant type, was sufficiently severe to indicate the great value of antitoxin.

DISCUSSION.

Dr. J. K. Freeman: As stated by Dr. Meyer, I saw his patient just before institution of the serum treatment, at which time he was in a desperate condition. There was marked rigidity of practically the entire muscular system, involvement of the abdominal muscles being especially noticeable, and he resented being disturbed for any purpose whatsoever. Any attempt to converse with him caused annoyance and increased the discomfort. While there seemed little hope for improvement under any method of treatment, it was decided to try large doses of antitetanic serum. The symptoms in this case did not supervene as early as they sometimes do after injury. My experience has been that the earlier the manifestations appear after the receipt of the injury, the more virulent and rapid the course of the disease, and in cases in which symptoms developed within six days the patients all died. Of course this was before the introduction of the serum treatment. Where symptoms developed later, while the patient did not succumb so quickly, nearly all of them perished when manifestations appeared twelve to fourteen days after the injury; but where symptoms were delayed until the eighteenth day not all the patients died, even before introduction of the serum treatment. In the treatment of tetanus most writers suggest the administration of bromides and chloral, and at times chloroform is used.

Several years ago when there were no restrictions concerning the use of so-called toy pistols by young boys, tetanus was quite common in Louisville. I remember during one Christmas holiday period there were a large number of cases. I had the misfortune to treat two of the patients, both of whom died promptly. In one the symptoms developed on the sixth day, in the other on the seventh day, after receipt of the injury.

I believe the antitetanic serum promises more in the treatment of tetanus than anything heretofore suggested, and in all cases of suspected infection by the bacillus tetani I think it would be distinctly advisable to administer a prophylactic dose. Such pro-

phylactic treatment subjects the patient to no additional danger, and may be the means of preventing much suffering in addition to the saving of many lives.

Dr. O. H. Kelsall: Dr. Meyer is to be congratulated not only upon his therapy but the results thereby obtained. As we all know, the mortality from tetanus has hitherto been very high. However, as Dr. Freeman has suggested, the mortality has been markedly lowered by the employment of antitetanic serum as a prophylactic measure. At Mercy Hospital (Chicago) in former years they had a great many cases of tetanus. More recently every patient admitted with punctured and lacerated wounds, more especially those inflicted by various kinds of machinery where contamination by dirt is the rule, is given a prophylactic dose of 1500 units of antitetanic serum. Not a single case of tetanus has developed in 1500 patients so treated, whereas in 1500 admitted before the serum was introduced they had a great many. Therefore, it would appear that the greatest value of antitetanic serum is as a prophylactic. After tetanus has developed, while the serum treatment offers more than anything hitherto suggested, in spite of the treatment many of the patients will die. It is not nearly so certain in its effects as antitoxin in diphtheria.

Dr. H. J. Phillips: During my service at the Louisville Public Hospital this summer one case of tetanus was treated with the antitetanic serum, but smaller doses were employed than mentioned by Dr. Meyer. The combined treatment was used, viz., serum, morphine, chloral, and bromides. The patient had stepped on a rusty nail, and ten days later the first evidence of tetanus appeared. When admitted to the hospital the disease was fully developed; the patient had opisthotonos, also the sardonic grin mentioned by Dr. Meyer; and the least disturbance would induce a violent convulsion. The wound was freely incised, and after being thoroughly cleansed with tincture of iodine, a moist antiseptic dressing was applied.

The patient was admitted at eight o'clock in the evening, and at eleven o'clock the same night he was given 3000 units of antitetanic serum; the next day 12,000 units, and the day following 5000 units. He received a total of 36,000 units of the serum, the last two doses of 6000 units each being administered intravenously.

I have been wondering whether the intravenous administration of the serum might not be more effective than by the subcutaneous method. This patient was extremely ill, and for several days his recovery seemed doubtful. He remained in the hospital twenty days, and when dismissed was free from manifestations excepting stiffness of certain muscles. The period of incubation in this case was about the same as in the one mentioned by Dr. Meyer, viz., the first symptoms of tetanus appeared on the tenth day after receipt of the injury.

The administration of remedies by the intravenous method has been greatly simplified during recent years. Most of us were taught that it was necessary to carefully isolate the vein by dissection before introducing the needle, but the procedure is now practically as simple as the giving of a hypodermic injection. I believe it is a fact that nearly all the serums are now administered intravenously; and it appears certain that the effect is more marked and rapid, and that improvement occurs with greater rapidity than under other methods of administration.

Dr. W. A. Bolling: Some wonderful results have recently been reported from the intravenous administration of antitetanic serum. Of course we can only hope to accomplish neutralization of the poison which is in the blood and lymph channels. When the serum is injected subcutaneously or intramuscularly, on account of the time required for absorption neutralization of the toxin is delayed. Certainly no harm can result from intravenous injection as the solution is thoroughly sterilized, and the serum will neutralize all the toxin with which it comes in contact. After the toxin has extended to nerves, and particularly the ganglionic cells, little benefit may be expected to accrue from the serum unless it

be introduced by intraspinous injection. No one can reasonably estimate the systemic resistance of the patient to the tetanus toxin, therefore an attempt should be made to neutralize the toxin with the serum as promptly as possible.

In one institution at Nashville (Tennessee) they have for some time used the intravenous method of administering antitetanic serum. In addition of course they have employed the routine treatment with Epsom salts, chloretone, the bromides, etc. Of five cases of tetanus recently reported, four recovered; whereas previously when the serum was not used at all the patients with tetanus died.

DR. E. J. MEYER (*closing*): It is quite probable that the intravenous method may be more effective than the subcutaneous employment of antitetanic serum; but when the case reported was under observation nearly all authors recommended subcutaneous injection of large doses. By employing the intravenous method smaller doses might produce greater benefit, as the serum is introduced directly into the blood-stream.

In the case reported I believe the serum markedly assisted in promoting quietude, the patient being fairly comfortable unless disturbed, and was able to sleep under the influence of chloral and bromide. It was noted that while the patient was sleeping the muscles relaxed to a considerable extent, but when awakened contractions again occurred. What apparently worried the patient more than anything else was that his tongue became considerably lacerated during some of the early attacks, and as a result was swollen and painful.

FIVE HUNDRED CASES OF OIL-ETHER COLONIC ANESTHESIA.

GWATHMEY in the *American Journal of Surgery* for July, 1914, makes a report on this method of anesthesia, to which we have already called attention in our editorial pages.

The cases of oil-ether anesthesia concerning which definite information has been received by him are as follows:

New York Post-Graduate Hospital, reported by Dr. Heyd, January 12, 1914	50
New York Post-Graduate Hospital, reported by Dr. Frazier	17
People's Hospital, reported by Dr. Robinson	20
Columbus Hospital	37
Smith Infirmary, reported by Dr. Wiltsie	75
Dr. E. M. Foote	22
Dr. Meeker	14
Dr. Hubert Arrowsmith, Brooklyn Eye and Ear Hospital	50
Dr. Lombard	62
Dr. Cantle, March 20, 1914	24
Dr. J. T. Gwathmey (estimated)	140
	511

COMMENTS OF OTHERS.

"The principal case of interest at the People's Hospital was a woman weighing 75 pounds, with a temperature of 104°, suffering from general diffuse peritonitis. This patient was held on three and a half ounces of a 75-per-cent mixture for an hour and fifteen minutes. She made an uneventful recovery."

"In the fifty cases reported from the Post-Graduate Hospital, eight were supplemented with chloroform. A trace of albumin was found in the urine about as often as when the inhalation was employed. There did not seem to be an indication to proctoscope any of the patients. In only three cases was there postoperative nausea and vomiting." Dr. Heyd's conclusion is that "where we had plenty of time to give the anesthetic properly, the results had been most satisfactory."

Not included in this list was a private case which also occurred at the Post-Graduate Hospital. The patient was a doctor's wife who had delayed having her tonsils removed for over a year, on account of very great fear of the anesthetic. This new form of anesthesia so appealed to her that she immediately decided upon an operation. The anesthetic was given to her in bed, without any complaint whatsoever, and the operation was entirely successful. However, a hemorrhoidal condition was made so much worse from the anesthetic that she had to be operated upon a few days later for this condition.

At the Smith Infirmary a supplementary anesthetic was required in one-third of the cases. The urine was negative as to patho-

logical findings. Those who had been operated upon previously with an inhalation anesthetic expressed a strong preference for the oil-ether method. Many patients thought they were receiving an ordinary enema, and upon awakening after the operation asked when they were to be operated upon.

Dr. E. M. Foote states: "My general impression of oil-ether rectal anesthesia is so favorable that I shall continue its use."

Dr. Lombard states that in his series of cases the kidneys were less disturbed than by ordinary methods; that it is more satisfactory with children than with adults; and that it was more satisfactory with women than with men.

In two emergency cases of Dr. Meeker's (children), no preliminary preparation of any kind was given, yet the anesthesia was entirely satisfactory.

Five of Dr. Cantle's patients had taken ether before, and all agreed that this was the more comfortable method, the preliminary sensation of choking and suffocation being entirely eliminated and there being no unpleasant after-effects. All patients made good recoveries, with no complications.

Dr. John B. Murphy writes that he has used the method once. He states that the anesthesia was perfect and that he expects to make frequent use of it in his clinic hereafter.

In a private case, in the writer's own practice—the patient being an insane woman—the mixture was placed in the hands of a nurse, who gave it to the patient as she was lying on a sofa. This case also was ideal in every respect. The writer has the reports of several goitre cases in which no intimation of an operation was given, and the technique was carried out as outlined, with entirely satisfactory results.

The writer's youngest case was a child two years old, satisfactorily anesthetized with a 50-per-cent solution.

After-effects.—The after-effects compare most favorably with the best methods of administering ether or chloroform. It has been given to consumptives, asthmatics, and to patients afflicted with bronchitis, and in no instance has the condition been made worse.

Indications and Contraindications.—It is especially indicated where the element of fear is in evidence, as in goitre cases; also with children and large athletic alcoholic men—cases in which occasionally a fatality results from fear. Large fat men and women are especially good subjects for this form of anesthesia. Such cases give the anesthetist much trouble with any inhalation method, on account of narrowed air-passages. It is especially indicated in bronchoscopy and gastroscopy, where the anesthetist would be in the way of the surgeon. It is especially indicated in the operations upon the respiratory tract, head, neck, and chest.

Contraindications.—It is contraindicated in any pathological condition of the lower bowel, such as colitis, hemorrhoids, fistulæ etc. When these conditions exist, they are aggravated by the introduction of oil-ether. Even when no pathological condition is known to be present, if the patient should complain very much upon its introduction, rectal anesthesia should be discontinued. Whenever ether is contraindicated, this method should not be employed, except in bronchitis, asthma, and similar conditions as previously mentioned. If, however, the patient has been ill from a previous ether administration, this is no contraindication to oil-ether anesthesia. Emergency cases usually contraindicate this method.

Advantages.—1. In administering ether by this method in bed, every principle of anociassociation, as enunciated by Crile, is fulfilled.

2. Absence of apparatus of any kind enables the anesthetist to devote his entire time to the patient.

3. An even narcosis automatically maintained.

4. Quiet, natural breathing, without mucous râles.

5. Reduction of postoperative vomiting, nausea, gas pains, etc., to a negligible quantity.

6. Return to consciousness in an analgesic state.

EDITORIAL.

LIGHT CHLOROFORM ANESTHESIA AND DEEP CHLOROFORM ANESTHESIA.

The study of the influence of anesthetics upon the vital functions of the body still continues to be of absorbing interest and importance. One would suppose that the host of investigators who have dealt with this subject during the last fifty years would have thoroughly exhausted it and arrived at definite conclusions in regard to even minor points, but this is not the case. At the present time we think it may be fairly stated that the depressant influence of chloroform upon blood-pressure is universally recognized. It is also true that instead of deepening the chloroform anesthesia at the moment when the surgeon is about to perform the most critical part of his operation, this plan has given place to the practice of letting up on the anesthetic at this moment, because the chloroform in no way protects the vital centers from the shock, and pushing the drug at this time subjects these centers not only to the shock but to the depressant effect of the drug simultaneously.

It has long been known that a very large proportion of deaths under chloroform occur in the earliest stages of anesthesia, at a time when it is natural to believe that so little of the drug has been inhaled that danger cannot be at hand. Various explanations have been brought forward for this undisputed clinical fact. Whether it is because the vagus is unduly stimulated and that this has an inhibiting effect upon the heart, depressed also by the influence of fear and the influence of the drug, is a question to be answered probably in the affirmative.

In the Proceedings of the Royal Society of Medicine for June, 1914, Levy brought forward in a forceful way certain views which he holds in regard to this matter. He asserted that light chloroform anesthesia is prone to produce a condition of ventricular fibrillation and claimed that one of the first principles of chloroformization is to keep the patient fully anesthetized and to make its administration continuous. He does not advocate excessive administration to the point of profound narcosis, as he thinks this is uncalled for except under rare circumstances, but he believes that the induction of anesthesia should not only be continuous but progressive, and that the strength of chloroform vapor should be increased as rapidly as is possible without distressing the patient, in order that he may be brought under the full influence of chloroform as quickly as is safe. Surely this is a view which is in strong contrast to that which has been generally held. Levy even goes to the extent of claiming that a vapor strength of four per cent may be used with impunity when attained by progressive stages, although he admits that it should not be used for long and should not be used at all unless necessary to rapidly carry the patient into full anesthesia. Rarely he thinks a two-per-cent vapor is sufficient. His point is not so much the percentage of vapor as the amount required to carry the patient quickly through the inductive stage.

Levy emphasizes another point, with which most anesthetists of experience are certainly in accord, namely, that the patient should be entirely undisturbed until fully under the anesthetic, and well says that it is too frequent a practice to attempt to save time by scrubbing or shaving the skin during the period of induction. This may produce excitement, and even the bandages should be left undisturbed until consciousness is absolutely abolished. So, too, the greatest care should be exercised that the skin incision in the early stages of the operation should be performed under full degree of anesthesia with the pupils slightly dilated and with only a faint corneal reflex.

Levy believes that the respiration is the most important function to watch, because by this means we are able to determine how much chloroform vapor is being taken into the body, but he also believes that the pulse should be studied in order to determine the

circulatory state, for an irregular pulse may be followed by ventricular fibrillation with startling rapidity. In the same way that he protests against moving the patient in the earlier stages of anesthesia he also protests against letting up on the anesthetic too early, believing that it should be continued until the final bandaging is completed. He strongly protests against any attempt to rouse the patient, and asserts when everything is completed he should be put back to bed with as little disturbance as possible.

For the reasons that we have given, Levy claims that the present-day teaching that safety lies in the attenuation of vapor percentages must be permanently abandoned, although there is no reason for the adoption of the extreme opposite practice, as excessive dosage is, of course, undesirable in every way.

The nature of ventricular fibrillation which he describes would seem to be somewhat of the same nature as auricular fibrillation as met with in cases of cardiac disease. When ventricular fibrillation is established the condition of the patient is, of course, desperate, and the only remedy is, as he suggests, massage of the ventricle. He does not believe, however, that this method should be attempted at once, for the heart may recover spontaneously, but two minutes' grace is all that he would advise. Curiously enough his theory leads him to believe that during this interval he would keep the lungs well charged with chloroform vapor by artificial respiration. This, of course, is in direct conflict with the universal practice of letting up on the anesthetic at the first sign of danger, and is so antagonistic to general practice and rational deduction that very strong evidence must be brought forward before his advice is generally followed. Furthermore Levy believes that atropine, which has come to be considered as so valuable a drug in chloroform accidents, favors ventricular fibrillation under light anesthesia, although he admits that atropine when deep anesthesia is required probably sustains the heart's action. Adrenalin he also thinks predisposes to fibrillation in light anesthesia, although it does not do harm apparently in deep anesthesia.

It is interesting to note that in the discussion of Levy's paper Blumfeld, the President of the Section on Anesthetics, while admitting that Levy's views were interesting and possibly worthy of acceptance, nevertheless seemed to be in favor of the early use of atropine and agreed that some of the deaths in early chloroformization were probably due to ventricular fibrillation. Gill continuing the discussion emphasized the point that however interesting Levy's work might be on animals, care should be taken that it be not too rigidly applied to men, and cited an instance in which section of the vagus nerve in a woman suffering with exophthalmic goitre produced no effect upon the heart speed, whereas, as is well known, such section in animals always causes an increase in rate. He also felt that there was greater danger in deep anesthesia than in light anesthesia.

FEEDING IN TYPHOID FEVER.

Seventeen years ago we became convinced from careful clinical observation that a rigid milk diet in typhoid fever was not only unnecessary but harmful, in that it does not provide a sufficient amount of nutrition for the patient, even when quantities of milk are ingested which are greatly in excess of those commonly given in this disease. We also became convinced that there was no reason why the average typhoid fever patient should not receive a variety of easily digested foods. Clinical experiences during these years have confirmed us in our belief as to the correctness of these observations. Some time after we reached these conclusions Shattuck of Boston published a series of cases which had been freely fed with a mixed diet with advantageous results, and during the last few years we have repeatedly called attention in these columns to other clinical reports and notably to several scientific investigations which have proved that the earlier clinical observations are correct. It is our belief that the milk-diet method in typhoid

fever is so harmful, in that it diminishes the patient's vital resistance, that we have laid particular emphasis upon this subject and have been fearful at times that we were devoting too much space to its consideration, notwithstanding its importance.

It is proper, however, to once more call attention to the latest research upon this subject by Coleman and Du Bois, which is published in the *Archives of Internal Medicine* of August 15, 1914. Their mode of research is based upon respiratory changes in typhoid fever. Accompanying their article is a copious biography dealing with this important subject. They carried out the dietetic methods employed by those who believe in a fairly full diet in this disease, and state that by the end of the first week their patients were usually taking a quart of milk, a little less than a pint of 20-per-cent cream, 3 to 6 ounces of lactose, 2 or 3 eggs, a couple of slices of toast, and from one-half to one ounce of butter. The patient is thereby provided with between 2000 and 3000 calories. In a short time 1000 more calories are gradually added by giving rice, oatmeal, mashed potatoes, cream of wheat, apple sauce, custard, and ice-cream. Coleman and Du Bois find that patients can be brought into nitrogen and weight equilibrium even in the active stages of the disease when the temperature is still high, and it has also been determined that the absorption of large amounts of food, in the shape of protein and carbohydrates, took place as well as in health. The carbohydrates were completely absorbed unless more than 10 ounces a day were given. Fats were also absorbed in very large amounts. On an average the patients lost in the feces only 5 per cent of calories ingested.

Not only is it true that patients who are adequately fed during typhoid fever have an approximately normal vital resistance and reach convalescence in a fairly good state of nutrition, as compared to the emaciation so commonly seen in underfed patients, but it is also true, as proved by the research which we are now quoting, that the idea that large amounts of food in the febrile period of typhoid fever may cause too great an increase in heat production, and so a rise in the fever temperature, is incorrect.

Coleman and Du Bois calculate that the average total heat production of the typhoid patient is 40 calories per kilogram per day. While it is true that, if the supply of nitrogen be sufficient, a normal man may be maintained in nitrogen and weight equilibrium on a diet which just covers his heat production, it is clear from their studies that typhoid patients producing an average of 40 calories per kilogram cannot be brought into equilibrium unless they receive food sufficient to produce from 57 to 81 calories, and in some instances more than this. Or to express it differently, a patient weighing about 150 pounds and producing about 2400 calories per day requires from 3600 to 5000 calories to maintain him in equilibrium. This may be expressed in still simpler language by the statement that the typhoid fever patient requires not only as much food as a normal man taking fairly vigorous physical exercise, but at least one-third more food.

If this be true the question as to what becomes of this excess of nutriment is of great interest, and Coleman and Du Bois, finding that there is no loss by overflow and little storage of fat, believe that the need for an excess of energy over heat production is in some way connected with the reaction of the patient to the infective agent, although they are unable to adduce any scientific facts in support of this view.

THE INFLUENCE OF SWEATING UPON THE NON-PROTEIN NITROGEN OF THE BLOOD IN NEPHRITIS.

From the earliest times the opinion has been held, not only by medical men but by the laity as well, that the induction of a profuse sweat exercised a very marked influence upon the human body, and particularly has this belief been adhered to in connection with those diseases which are supposed to be dependent upon disorders of metabolism or upon certain forms of infection.

It must be admitted that even at the present time this method of treatment, however advantageous it may actually be, is nevertheless largely empirical, there being little or no scientific evidence in support of the widely diffused idea to which we have referred. Comparatively recently a number of interesting researches have been carried out by laboratory investigators in this country and abroad, who have endeavored to throw light upon this subject, but up to the present time no material advantage to our knowledge, except of a rather negative value, has been made, chiefly because there are certain inherent difficulties in carrying out a research of this kind, and possibly, too, because the lines of research have been erroneous.

An interesting contribution to this subject has been published in the *Journal of the American Medical Association* of September 12, 1914, by Austin and Miller, who quote somewhat extensively the literature upon this subject and give the results which they obtained in twelve cases of nephritis which were subjected to the hot-air cabinet treatment, the air being heated by electric bulbs, or, if the patient was too feeble for this method, to a vapor bath in bed. Their conclusions are that these baths do not produce any significant change in the concentration of the non-protein content of the blood, although they do not deny that "there is a possible therapeutic value in sweat baths."

We have long been of the opinion that the advantage gained by such treatment did not lie along any one line but depended upon a number of factors. We have also thought, and there is scientific evidence in support of this view, that the least important factor was the elimination by the skin of toxic substances. On the other hand, there can be no doubt that such baths influence the circulation of blood and lymph and possibly by so doing alter nutritional processes, which at the present time are not understood. Then, too, it must not be forgotten that such baths materially influence the state of the nervous system, usually acting as a sedative, and they, at least indirectly, produce an effect upon the circulation in the kidneys and in many other of the important internal viscera. It is probable that they influence the circulation in the lymph spaces, in the liver, and in the kidneys, and in these organs the greater part of the benefit is attained. The extraordinary benefit which is produced in so-called muscular rheumatism and in certain conditions involving the lymph tissues of the pharynx, ear, and eye proves beyond all doubt that the clinical application induces diaphoresis, is advantageous, and fundamentally correct.

ALUM IN ITS RELATION TO FOOD.

The great campaign which has been waged for a number of years with the object of preventing the use of adventitious substances in foodstuffs has without doubt done a great deal of good, but it has also in some instances worked a hardship, not only to the manufacturer or producer of the foodstuff involved in connection with the use of preservative, but also to the consumer, in that in many instances he has to pay a higher price because the foodstuff cannot be preserved intact for so great a length of time as when some antiseptic preservative is used. It is not our intention to deal with the pros and cons of the large subject of preservatives, the field is too wide and too much can be said on either side, but we may say, before going on to the special subject of this note, that those who have had the enforcing of the so-called "pure food laws" have sometimes, in their enthusiasm, carried their crusade too far, and in some instances have induced State legislators to pass laws which, if the legislators had been fully informed, would not have gotten upon the statute books.

In this connection it is of interest to study for a moment the employment of alum in connection with foodstuffs. Used in pickles for the purpose of hardening the pickle, alum enters the alimentary canal, and, by its astringent properties, it is conceivable that if alum-laden pickles are eaten in considerable number it may disorder digestion.

This holds true in all instances where alum in any considerable quantity is taken as alum in food. The proposition as to the employment of alum in baking powder is, however, an entirely different one. In this instance we start out with sulphate of aluminum and potassium, or ammonium, and bicarbonate of soda. When mixed in the dough for the purpose of making bread the sulphuric acid in the alum combines with the soda to form sulphate of soda, Glauber's salt, with the result that we have present aluminum hydroxide, a perfectly harmless substance, which passes through the alimentary canal without producing any effect and without being absorbed. The writer of this editorial gave testimony along these lines a number of years ago, and was fully convinced that in the case of alum baking powders no danger existed from their employment in reasonable quantities.

We think that our readers will be interested with us in the conclusions arrived at by the Board of Experts appointed by the United States Department of Agriculture, which Board, in Bulletin No. 103, has proved by careful experimental investigation that the statement just made concerning the chemical changes and absence of deleterious effect is correct. This Board found that very large quantities of alum in the form of baking powders produced catharsis, which is due to the presence of the sodium sulphate, to which we have already referred. The same investigation also revealed the fact that when alum compounds are mixed or packed with food the quality or strength of said food has not been found to be thereby reduced, lowered, or injuriously affected.

MODERN METHODS OF TREATMENT OF SYPHILIS OF THE NERVOUS SYSTEM.

Those who have followed the literature on this subject will be struck, first, as to its richness as far as quantity is concerned; second, as to its futility judged by the numbers of cases materially bettered. From convincing statements to the effect that the late nervous lesions, so often regarded as postsyphilitic, are in reality syphilitic and dependent upon the persistence of the germ, it might be assumed that through the adoption of active treatment, particularly the so-called modern treatment, by which is meant supplementing mercury with arsenic, a cure might be effected in a large proportion of cases. That this result has not been achieved is variously explained. Perhaps the reason most generally accepted is the fact that the spirochætæ are sufficiently removed from the direct effect of the specific remedy circulating in the blood to be little if at all affected by them. A communication by Sachs, Strauss and Kaliski (*American Journal of the Medical Sciences,* November, 1914) from this standpoint is of more than ordinary interest since they report on some 120 cases, noting that the spontaneous remission and exacerbation of all forms of syphilitic nervous diseases make it particularly difficult to ascertain accurately the effect of any form of treatment. Fifty-five of their cases were tabetic, 20 were paretic, 41 were instances of cerebral and cerebrospinal lues, three of optic neuritis, and two of specific spondylitis. As a routine method of examination all patients were subjected to a lumbar puncture, and the blood was tested. The caution is given that for at least eighteen hours after lumbar puncture the patient should be kept on his back, since intense headache and symptoms of meningeal inflammation are apt to follow the operation.

The treatment is guided by the outcome of the various biological reactions. In the presence of an active luetic process, intensive treatment was administered. Under such conditions the authors gave as a routine practice a series of salvarsan injections intravenously at intervals of seven to ten days, the average dose being 0.25 to 0.4 gramme. After four to six injections of salvarsan had been given the patients received a series of intramuscular injections of salicylate of mercury in 0.5- to 1-grain doses. This injection may be continued weekly until ten to fifteen injections have been administered. Several such courses

are given, with intervals of three to four weeks. Dreyfus is quoted to the effect that much more harm can be done by giving too little than by giving too much. The era of excessive individual dosage has passed, and if salvarsan is properly administered with due regard to the patient's condition, after careful examination of the heart and after ascertaining that the kidneys are normal, the drug can be given repeatedly. The only real contraindications are severe renal involvement, very marked cardiac disease with insufficiency of cardiac muscle, impending coma in diabetes or nephritis, terminal conditions which are not likely to be benefited by the salvarsan, and a known intolerance to the drug. The neosalvarsan is now preferred by the authors because of the small quantity of fluid used in its preparation, the less frequent incidence of immediate and remote by-effects, and the ease of its application. They give it in doses of 0.2 to 0.6 gramme.

The efficiency test of any antisyphilitic treatment is to be found in the improvement in the subjective and objective symptoms as well as in the change toward normal in the various biological reactions—to wit, Wassermann reaction of the blood and spinal fluid, cytological count, globulin content, and the luetin test. Aside from the fact that the intraspinous methods are all more difficult to perform than the simple intravenous injection, and surely more painful, an analysis of their cases shows that the intravenous injections alone yielded equally good results. During the past few months the authors have familiarized themselves with the injection of solutions of salvarsan and neosalvarsan in minute doses directly into the subdural space of the spinal canal. The original methods of Wechselmann and Marinesco have been modified by Ravaut, who uses a 6-per-cent solution of neosalvarsan in water. Thus if 0.6 gramme of the drug were dissolved in 10 Cc. of water, each minim would contain approximately 0.003 gramme of neosalvarsan. The needle is introduced as for lumbar puncture, the spinal fluid allowed to run into the funnel of the apparatus, from one to four drops of the solution are added, and the mixture is then allowed to run by gravity into the spinal canal. The authors of this paper dissolved 0.15 gramme of neosalvarsan in 15 Cc. of freshly distilled water or salt solution. Thus each 0.1 Cc. contains 0.001 gramme of neosalvarsan. Of this solution from two to ten or more tenths of a cubic centimeter are added to about 10 Cc. of the patient's spinal fluid. After gently agitating the mixture of spinal fluid and solution in the funnel the fluid is allowed to return slowly into the canal. In this way a minimal amount of fluid is introduced into the canal.

That the intraspinous injections are not without danger to the patient is evident enough. Sometimes the pain is so intense as to require opium. Paralysis sometimes follows. In one case after the intraspinous injection of 6 mgms. of neosalvarsan complete paralysis of the legs and marked paralysis of the vesical and rectal sphincters developed and persisted for three months, when the patient died. In another patient, with general paresis, three weeks after the sixth intraspinous injection of neosalvarsan, all of the injections having been tolerated without great discomfort, an acute ascending paralysis of the Landry type developed, and death supervened. The authors state that in view of these facts they have hesitated to urge any form of intraspinous treatment. Examinations of the spinal content prove that there is an active specific process going on within the cerebrospinal system. The injection of salvarsanized serum is an ingenious and fascinating proposition for which Swift and Ellis deserve great credit, but before accepting this method as one of value the presence of salvarsan or free arsenic in the blood of patients treated by intravenous injection must be established. Benedict has analyzed ten different specimens of blood which were obtained fifteen to twenty minutes after the intravenous injection of salvarsan. He was able to detect only 0.00004 to 0.0001 gramme of metallic arsenic in 20 Cc. of blood. A man of ordinary weight if injected with 0.4 gramme of salvarsan

would have in every cubic centimeter of his blood immediately after the injection, before elimination or fixation by the body cells began, about 0.0001 gramme of salvarsan. Thus it is apparent from the analyses of blood taken within three-quarters of an hour after the injection of salvarsan, that the arsenic is not free in the blood-stream, but is probably bound by the receptors of the body cells. Hence it follows that the serum obtained from the blood withdrawn must depend for its efficiency upon some other factor which is yet not determined. If this action depends upon the presence of antibodies in the blood, it would be much more rational to withdraw the blood a day or more after the intravenous injection.

It has also been shown, from an analysis of four specimens of spinal fluid withdrawn twenty-four hours after an intravenous injection of salvarsan, that the spinal fluid contains free arsenic in about one-sixth to one-tenth the concentration in the whole blood. This is contrary to the usual belief that none of the drug administered intravenously finds its way into the spinal canal. Thus it is apparent that the salvarsanized blood serum injected intraspinously contains actually less arsenic than is found to be present in the cerebrospinal fluid after simple intravenous injection. Also, it has been shown that the injection of normal serum has reduced the cell count from 302 to 32 cells per cubic millimeter, while the positive Wassermann persists. There may be a steady progression of tabes, for instance, from the clinical aspect, with subsidence of the biologic phenomena until finally the reactions become entirely negative. The cell count may be markedly reduced and the Wassermann become negative in the spinal fluid, but remain positive in the blood.

As to the clinical effects of the treatment in tabes dorsalis, the most striking effect of the intravenous injection has been to change a progressive into a non-progressive type; the pain is usually relieved. Yet there is also sufficient evidence to show that in spite of early and intensive treatment the progress of an impending tabes cannot be averted. The case is cited of a man who for many years exhibited an Argyll-Robertson pupil, who received twelve injections of salvarsan intravenously and innumerable injections of mercury, in spite of which the symptoms continued progressive. Whilst it is acknowledged that cases of arrest of tabes were occasionally observed before the salvarsan era, it is emphasized that this did not occur so frequently as under the present methods of treatment.

As to cerebral and cerebrospinal syphilis including cases of chronic headache, ophthalmoplegia, and particularly hemiplegia, the improvement after salvarsan has been most satisfactory. The headache and ocular palsies have disappeared more rapidly than under any previous form of treatment. In hemiplegia, probably since the process is an active one affecting the blood-vessels and the meninges chiefly, salvarsan seems to be specially effective.

In optic neuritis energetic salvarsan treatment has been productive of excellent results, the optic nerves having recovered from severe lesions. As to the results of treatment in general paresis the authors report that they have so far been unable to effect a cure in a single case. In some cases the disease has apparently been arrested in its early stages, temporarily at least, by giving a few doses of salvarsan intravenously; in others the fatal termination seems to have been hastened by specific treatment.

It is undoubtedly true that the most remarkable recent achievements in the treatment of syphilis of the nervous system are due to the early recognition of all forms of syphilitic disease. Whenever there is a strong suspicion of syphilis, particularly if there is corroboration of the diagnosis by examination of the blood and the cerebrospinal content, but even in the absence of such corroboration, the most intensive salvarsan treatment should be instituted. Under the ordinary precautions such treatment will do no harm and be productive of great good. This judicial summing up of a large personal experience is particularly valuable, since with a restraint un-

usual the authors have avoided the confounding of *post* and *propter* and have recognized the extraordinary symptomatic fluctuations. For cure in all chronic luetic affections, and particularly in chronic involvement of the central nervous system, they frankly acknowledge that the new treatment offers little that was not provided by the old. It is prompter and more efficient, but has not transferred from the incurable class those lesions which were beyond the reach of mercury.

RECTAL SURGERY.

The relegation of affections of the rectum to the specialist and proctologist would seem desirable from the standpoint of the surgeon who so frequently is called upon to operate for cancer in its later stages, when beyond the reach of curative measures, because the characteristic and well-marked symptoms which should have warned the general practitioner at least six months and sometimes several years before, during the period when the affection was a purely local one, were entirely neglected, or if considered at all were explained by the presence of hemorrhoids revealed by purely casual and superficial examination. It would seem, however, that neither rectal diagnosis nor treatment requires such an elaborate training in diagnostic methods, such an assortment of examining and therapeutic appliances, or such a highly developed special technique in the execution of the various procedures designated to cure, that specialization should be needful. In the report of proctologic literature by Earle (*The Proctologist,* September, 1914) there have been collected data bearing upon rectal affections of the highest interest. Thus Cole's study concerning the intramural spread of cancer of the rectum is quoted at length. He points out that rectal adenocarcinomata usually present a typical ulcerating appearance with irregular and everted edges, with the long axis of the ulcer transverse, showing a tendency to involve the bowel circularly rather than longitudinally. Ulceration evidently begins at an early stage. Microscopic examination indicates that the initial carcinomatous focus begins as a down-growth of glandular epithelium into the submucous coat, which then either undermines the glandular epithelium, cutting off its blood supply and thus inducing necrosis and subsequent ulceration, or secondarily involves the overlying healthy mucosa. The muscular coat is invaded to an equal and frequently to a greater extent.

There is a tendency of the stromal growth to progressive contraction, thus pulling on the deeper layers of the adjacent but uninvolved bowel and producing that eversion of the margins of the ulcer which is such a marked feature of these growths.

Invagination is frequently observed in those cases in which the greater part of the circumference of the bowel is involved, and causes the growth to assume the form of a cervix-like mass protruding downward into the lumen of the bowel. The intramuscular lymphatic plexus is regarded as largely responsible for the circular distribution of carcinomatous growths. Collecting trunks are formed on the posterior aspect of the bowel, those from the rectum draining either into the anorectal glands situated within the fascia propria or into the mesocolic glands lying between the layers of the mesocolon.

It is noteworthy that an area of uninvolved mucous membrane should occur also on the posterior aspect of the gut at the site where the collecting trunks are in process of formation.

The author advises wide excision, far wider than is suggested by the usual rule of one inch above and one inch below the obvious infiltration, and supports this view by clinical and post-mortem evidence, since in every case microscopically examined the growth had spread to the tissues outside the bowel wall.

This paper is a plea for early operation based on the proof of a wide extramural spread of carcinoma. Moreover, it is a further plea for laparotomy in conjunction with the perineal operation.

Bachmann, a surgeon, describes a modi-

fication of the Whitehead operation, which he holds is attended by very little hemorrhage, makes an accurate and secure line of sutures, places the scar near the skin, and causes no severe pain. The operation is performed as follows:

Eight pairs of curved hemostats and the same number of straight hemostats are required. The rectum is well dilated. Eight deep mattress sutures are placed well beyond the hemorrhoidal mass into sound mucous membrane at points corresponding to 12, 3, 6, and 9 o'clock, and half-way between each of these—eight in all. Chromic gut is used. Straight hemostats are attached to ends of sutures left long.

Well out on the mucocutaneous juncture corresponding mattress sutures are placed —eight in all—and curved hemostats being attached to ends of sutures left long. The hemorrhoids are now between rows of sutures. The mucous membrane is cut circularly around the internal row, the sutures being avoided. Next the mucous membrane is cut circularly near skin sutures, taking the same precaution. The entire pile-bearing area is now outlined and limited by two circular incisions. With blunt, curved scissors this napkin-ring of hemorrhoidal mucous membrane is dissected and cut free. A stream of hot saline solution facilitates all this cutting and reduces hemorrhage. Tie 12 o'clock mucous suture to 12 o'clock skin suture; 6 o'clock mucous to 6 o'clock skin, etc. Dress with tube.

Robins's method of closing various defects by sliding the rectum is taken up. He points out that to cover defects in the lower portion of the rectum, we can have at our disposal the upper loosely embedded rectum by dissecting through the fixed attachments of the rectum below, and then separating the upper portion by pushing the connective tissue and fat back with a piece of dry gauze. By loosening up the rectal tube in this manner we can bring it down for as much as two to four inches. By dissecting to the inner side of the sphincters no injury is done to these important structures.

The difficulty in repairing various defects in the rectum has not been in closing the defect by suture, but in preventing infection from the rectal canal, and the danger from this is so great that whatever method of suture is adopted the percentage of failures will always be high. By bringing down the rectum in the method indicated, danger of infection is eliminated because we have no opening whatever into the gut.

Williams summarizes the results of his investigations and experience with the electrolytic current. He calls attention to the electrolytic treatment of hemorrhoids, since by this means the varicosities can be safely cured. Electrolytic treatments are not so easily given as electrocautery treatments, the former requiring more time and more exactness of technique.

Preference is given by Riggs to Elting's method of treating fistula, that surgeon having used the method with perfect success in over 100 cases. There is nothing unusual or complicated in the operation, which consists merely in a thorough dilatation of the sphincter, excision of the involved rectal mucous membrane, and replacing it by healthy mucosa brought down from above —as in a typical Whitehead operation for hemorrhoids. The sinus and its ramifications are then freely and thoroughly opened and excised, or curetted and packed with gauze. The hollow rectal plug inserted in the bowel for counter-pressure and prevention of hemorrhagic oozing may be removed in six or eight hours. The bowels are moved on the third day. The gauze packing in the now widely opened sinus is started on the third day and gradually withdrawn. The wound heals rapidly.

The point is this: the inner opening must be closed if an operation is to succeed. This may, in a measure, be accomplished by cutting the sphincter, thus making the wound a flat one which readily heals by granulation, but with questionable outlook for a properly functionating sphincter. In practically all cases of complete fistula the inner opening is at a point within the hemorrhoidal area. It is logical to conclude that a thrombosed hemorrhoidal vein is the *locus minoris resistentiæ* from which, in most cases, a fistula develops. Few complete

fistulæ develop without a preceding ischiorectal abscess. Few ischiorectal abscesses heal without a fistula. Deep fistulæ cured by incision and packing are few. The circle, while incomplete, is suggestive—and the law of exceptions we recognize.

Mummery is quoted to the effect that the really important fact in preventing spontaneous healing of a fistula is inadequate drainage. If the track of the fistula is thoroughly drained by carefully planned incision of the parts, healing will take place, even if none of the muscular structures have been divided. It is essential, however, not only to provide adequate drainage at the time of the operation, but to so plan the wound that there shall be adequate drainage of the deeper parts of the track until these deeper parts are healed. It is a peculiarity of wounds involving the anal canal that the part of the wound which lies in the bowel and involves the mucous membrane does not heal so fast as the cutaneous portion of the wound.

Stone reports on the "Immediate and Late Results of the Whitehead Operation for Hemorrhoids." He mentions a number of postoperative complications and states that for the relief of pain most cases require morphine. Patients were discharged with a granulating surface in the majority of instances. The ultimate results were secured in 185 cases. They were perfect in every respect in 72.4 per cent. The most frequent complaint was disturbance of the sphincteric action. The patient felt some weakness when the bowels were loose. There was only one case in which there was absolute paralysis of the sphincter. There were some cases of itching or moisture. In five cases there was a certain degree of stricture. In a number there were minor recurrences. The definite indication for the employment of the Whitehead operation is the existence of a rosette or complete circle of varicosities.

This summary is of interest in particular because it suggests that the most important contributions to the surgery of the rectum are from the surgeon, not from the proctologist. It is of value not so much because it brings new procedures to the front, as because it emphasizes those which are of major importance.

RECENT EXPERIMENTS DEFINING THE DANGERS OF ANESTHESIA.

In an article thus titled Henderson *(Surgery, Gynecology and Obstetrics,* September, 1914) a distinguished physiologist whose name suddenly became familiar to the entire surgical world through his pronouncement to the effect that one of the dangers, and a very imminent and pressing one, occurring during the administration of ether is incident to the production of a condition of acapnea due to deficient CO_2 in the blood, and that this acapnea and fatalities resulting therefrom may be prevented by the administration of CO_2 to the patient, summarizes recent laboratory work and makes some suggestions not without their appeal to the practical man. He notes that the past five years have probably contributed more to the precise knowledge of anesthetics, their practical use and the real nature of their dangers than the preceding thirty. Although there were indeed investigations in those dark ages, he holds that they overlooked the essential point and reached a wrong conclusion, and were to a great extent merely a rattling of dry bones. The expressions "failure of respiration," "failure of the heart" summed up everything, though a few broad-minded persons recognized also a vasomotor failure. The cause of trouble was assumed to be nothing but an excess of anesthetic, or some vaguely guessed at weakness in the patient.

The assumption that fatalities under anesthesia must be due to excess of anesthetic is one which must be abandoned. Levy has shown that primary heart failure under chloroform is a perfectly definite and easily induced result of very definite conditions. He quotes cases from the literature showing that one of the essential conditions of such fatalities is light chloroform anesthesia. Such mischances do not occur under deep chloroform anesthesia, for the

heart is then merely depressed, and as respiration always fails first it is usually easy to effect resuscitation. It is not depression, but an abnormally intense irritability of the heart which is the condition underlying this class of fatalities.

Most of the fatalities quoted by Levy, which occurred either during the initiation or termination of anesthesia, involved besides the light anesthesia another factor, namely, excitement, strong sensory stimulation, or an injection of adrenalin. Henderson has repeated with entire success Levy's primary experiment in which adrenalin is administered to a cat lightly chloroformed, and obtained exactly the same sudden heart failure and complete and irrecoverable fall of arterial pressure which Levy's experiments show. The condition induced is a fibrillation of the ventricles—delirium cordis—a condition which, unlike mere cardiac inhibition or vagus or asphyxial standstill, is, in as large an animal as man in the majority of cases, practically irrecoverable.

Experiments to determine whether similar deaths could be produced in cats by means of adrenalin or sensory stimulation or prolonged excitement under light ether anesthesia failed, although a certain degree of cardiac irregularity which is a condition precedent to delirium cordis was present. Under light etherization Cathcart and Clark find that in rabbits the heart is markedly depressed by a degree of asphyxiation which is quite harmless under full anesthesia. This view bears out the point that few anesthetic fatalities are due merely or mainly to excess of anesthetic.

Incidentally Henderson remarks that in view of what we now know of the dangers of postoperative chloroform poisoning and the not infrequent toxic effect on mother and child when chloroform is used in labor, it is about time that the use of chloroform should be given up altogether.

Henderson then takes up the subject of partial asphyxia under light ether anesthesia. He comments with some force upon what he calls the open method. As a result of the study of a clinical case, the patient exhibiting at times marked cyanosis in the early stages, he found from the Rovsing bag which was used that the oxygen content of the air in the bag and the patient's color showed the closest correspondence. Low oxygen in the inspired air occurred with cyanosis and a fair amount of oxygen with a good pink color. He believes that if analyses had been made of air from the open mask the same correspondence would have been proved. If so, this mask was really far from open, since when the patient became rigid not only was ether poured on in a steady stream, but the mask was also pressed down on the face until marked cyanosis occurred. The Rovsing mask and bag seemed to keep the patient a better color, in spite of the difficulties of the case, as well as affording a more satisfactory control of conditions, than did the open, drop method with which it was alternated.

This observation has made him skeptical as to there being a marked difference between open and closed methods. He holds that the open method as applied to ether is a very crude and unscientific procedure. In the first place more than half of the ether is volatilized during expiration and blown off into the room. Boothby has recently demonstrated that the amount of ether in the inspired air necessary to produce and maintain anesthesia is exactly the same in all subjects no matter whether refractory or otherwise. It should be recognized that although ether is for the anesthetist a liquid, it is for the patient just as distinctly a gas as is nitrous oxide. The prediction is ventured that in every well-ordered and scientific operating-room where ether is used at all, instead of its being poured as a liquid over the patient's face and into his mouth, there will be a device from which the ether will be volatilized and from which it will be conducted to the patient's nose and mouth, as if it were merely an unusually strong variety of nitrous oxide. That this idea is rapidly gaining recognition and acceptance is evidenced by the insufflation method of Meltzer, Flint's device, and the anesthetometer of Connell.

Henderson alludes to his experiments in dogs showing that one can administer ether so badly as to maintain for twenty or thirty minutes at a time a very excessive respiration, and that thereafter the animals were prone to a failure of the breathing, which without measures of resuscitation frequently proved fatal. Meyer and Haldane have confirmed Henderson's views in regard to pain and ether in exciting hyperpnea. It has been shown that the breathing is controlled not by oxygen needs but by the CO_2 output, that there is a large reserve of CO_2 stored in the body, and that if the breathing is abnormally excited and this store considerably reduced, there is certain to follow a compensatory period of reaccumulation, during which respiration is subnormal to the point of cyanosis and partial asphyxia, or in which the breathing even fails altogether. Henderson has shown that with a low grade of ether or with the best ether exposed to air and light there is induced a very marked hyperpnea in a sensitive subject and a considerable augmentation of breathing in insensitive subjects. Whenever hyperpnea was induced it was followed by exactly such a period of subnormal breathing, Cheyne-Stokes respiration, and apnea interrupted by deep gasps as is the well-recognized result of acapnea—*i.e.*, diminished CO_2, consequent on excessive respiration.

Such a condition of insufficient breathing is an extremely common consequence of insufficient etherization. It adds the evil influences of a more or less prolonged period of insufficient oxygen supply to the other conditions lowering the patient's vitality. The logical method of prevention is some such method of administering ether vapor as Dr. Gatch showed to be so advantageous with nitrous oxide, and also some method of administering a sufficient amount of CO_2 in the air breathed after the anesthesia is ended to stimulate respiration to a more rapid elimination of the ether with which the body is saturated and to prevent apnea or subnormal breathing, anoxemia, and cyanosis.

The clinician reading Henderson's highly valuable contribution to the subject of anesthesia is struck first by the fact that his observations must have been made in a clinic where a skilled anesthetist was not employed and therefore derive their main value from drawing a wide attention to the need of such specialists whenever a general anesthetic is given. That a condition of acapnea may result from violent struggles and forceful breathing has been abundantly proven both by laboratory experiment and clinical observation. That it is customary in well-ordered clinics cannot be accepted—indeed, it probably is never seen there. As to the use of chloroform, practically all modern surgeons in this country are in full accord with the suggestion. As to the value of providing an apparatus for the previous volatilization of ether before administering to the patient and substituting an accurate method with a perfectly definite saturation for the drop method now employed, there is much to be said for this, but it is not likely to receive wide acceptance until it is shown more conclusively than has yet been done that the skilled anesthetist by the ordinary simple method has more trouble and a higher mortality than he who uses a more elaborate procedure.

REPORTS ON THERAPEUTIC PROGRESS.

ATROPHIC RHINITIS: TREATMENT WITH SCARLET RED.

In the *Laryngoscope* for May, 1914, WOOD gives an outline of the technique he employed. He originally applied the scarlet red ointment which is used in the surgical dispensary. This he was told is a 10-per-cent ointment. He found, however, that it was too stiff, rolling up and falling from the turbinals as fast as it was applied. The druggist then thinned it down for him with liquid petrolatum until he had an ointment which would spread nicely over the turbinals and adhere to them. This resulting ointment was a little over 5 per cent.

The writer first applies hydrogen peroxide to both nasal chambers and thoroughly removes all crusts. The nose is then carefully sprayed with an alkaline, antiseptic solution, after which the scarlet red is applied to every portion of the mucous membrane in the nose, and the patient instructed not to blow the nose immediately but to wipe the secretions away as they appear at the external nares. There seems to be no noticeable reaction after the application, nor does the patient complain of any disagreeable sensations.

After a few treatments, however, the patient notices a stinging sensation after the scarlet red has been applied, which, together with the return of the sense of smell, would seem to indicate a regeneration of the nerve filaments.

THE USE OF PITUITARY EXTRACT IN OBSTETRICAL PRACTICE.

MILLER, writing in the *Pan-American Surgical and Medical Journal* for August, 1914, mentions the use of pituitrin in postpartum hemorrhage. It is the ideal remedy in that one can get a result within six or seven minutes after its injection, and it will control the uterus better than any other remedy that has been offered. It practically takes the place of ergot, which we have been skeptical about for some time.

Another point the writer would mention is that after Cæsarian section it makes an ideal remedy to be injected as one removes the child. If injected before the child is removed, one will get a tetanic contraction and may lose the child.

Another point which the writer thinks ought to be mentioned is the use of this drug in postoperative conditions for moving the bowels. Heretofore we have used enemas, purgatives, and we have had these cases vomit for days, and fill up with gases, but we may expect a bowel movement after its use in fifteen minutes. Its action is positive, and one can expect results. Recently the writer had occasion to use it in a case of gall-bladder work, and within twelve minutes after injection the patient had a large bowel movement and was quite comfortable.

It may have a place in typhoid fever, which the writer does not care to discuss at this time. He recommends it in any case in which the patient is annoyed by tympanites and is uncomfortable.

A REMEDY FOR BOILS AND SKIN INFECTIONS.

Writing in the *New Orleans Medical and Surgical Journal* for July, 1914, ALLEN says that it is often small afflictions which annoy us most, probably on account of their frequent visitations, but certain it is that boils cause suffering out of all proportion to their size. The writer has been afflicted almost constantly for the last six months with boils and ordinary pyogenic skin infections, sometimes taking one form, sometimes the other, often having as many as six or eight scattered about on both upper extremities from the fingers to the axillæ, and often of such size as to incapacitate him.

As is usual with such things the remedies are legion, but the real cures few. During Allen's experience he has carefully tested every reasonable remedy and searched the literature for better.

All local remedies ever used for these purposes were well tried, and after their demonstrated failure, discarded; these measures included purely topical applications, and the deep injection of 20-per-cent and 30-per-cent solutions of carbolic acid injected well into the center of the infected area. This treatment, while of some value and doing much apparent good in occasional cases, is not to be recommended as a routine, but only for use in selected cases.

Autogenous vaccines were tried on two occasions and abandoned; once the culture showed staphylococcus albus, the second time the aureus; mixed stock vaccines (Van Cott) were also used, but likewise with apparently no benefit. A large course of sulphur baths was indulged in, and while they appeared to exert a favorable influence at first they seemed to have little effect toward the end.

Cerevisin was used to no effect and abandoned for pure baker's yeast (Fleischmann), a remedy much in vogue at the present time and credited with some virtue. Allen ate a cake a day, in four doses, for several weeks, and finally had to discard it as of no value in his case. This last remedy seemed to have afforded some amusement to his friends, who facetiously claimed that his eating of yeast was due to his desire to rise in the profession, and kindly predicted for him a great future.

Matters had now reached a point where it was either get well or give up work and seek relief by a change of climate, or a sojourn at some watering-place, when, in talking with Dr. J. N. Roussel, he suggested that Allen use a freshly made preparation of dilute nitromuriatic acid, 10 to 15 drops in water after each meal. In a few days Allen could note some apparent improvement, and soon realized that he was getting better; well-developed lesions soon disappeared, and those in process of development were aborted. Allen kept it up long enough to feel sure that it did him good and that the venomous coccus had at last been routed. During its use he saw many lesions started in a hair follicle, which in the past would have promised much trouble for him, disappear in a few days. As a result of this experience he can highly recommend the above remedy. He is thoroughly convinced of one other fact, contrary to the usually accepted surgical views, which is that boils and superficial skin infections do better when not opened. Should they come to a head and point they can easily be evacuated, but their incision accomplishes nothing in shortening their course or lessening their pain; on the contrary, it seemed at times to prolong their duration and to add to the violence of the inflammatory reaction. The success of the dilute nitromuriatic acid is particularly interesting, as among other remedies which he had tried and abandoned were dilute sulphuric and phosphoric acids.

THE TREATMENT OF LARYNGEAL TUBERCULOSIS.

GETCHELL, in the *Boston Medical and Surgical Journal* of July 2, 1914, recognizes the fact that these cases tax the resources of the physician to the utmost. The armamentarium is Dobell's solution, Dobell's with formalin, menthol inhalation, orthoform in powder or lozenge, heroin in spray, morphine, cocaine in tablet triturate 1/10 of a grain laid on the back of the tongue before eating, and powders which combine these agents. Of surgical measures there are deep injections into the region of the superior laryngeal nerve of alcohol or alcohol and eucaine, removal of a diseased epiglottis or arytenoids, and finally, in extreme cases of obstruction, tracheotomy.

In passing Getchell would like to say a word about throat treatment for cough. At Rutland there were several patients who for a considerable period before application for admission had been treated for cough without examination of the lungs, sometimes for even a year. These treatments had consisted of throat applications, intratracheal injections, removal of tonsils and uvulas, and operations on the nose. Personally, Getchell never treats a patient

for a continued cough without a thorough examination of the lungs, the patient stripped to the waist, for the diseased part may be found at the base of the lungs. Probably these cases drift along because the laryngologist is not used to examining lungs and does not think the condition serious enough to send the patient to another for such examination. In some of these cases careful watching of the pulse and temperature would show some constitutional trouble was afoot, acting on which hint a complete examination would save valuable time. Or if there were any sputum, an examination of the sputum in exceptional cases would clear up the diagnosis.

THE USE OF VACCINES IN CHRONIC EAR INFECTIONS.

HASKINS writes on this topic in the *American Journal of Surgery* for July, 1914. He is convinced that most excellent results have been obtained with the vaccines, especially so as many of his cases had resisted all other efforts, even failing to dry up after operation.

As so many cases have dried up under local treatment, it is interesting to state the methods employed. It is well to remember that in treating any suppurative process in the ear, it is necessary to keep all moisture out of the canal. If the patients are told to irrigate, it is safe to say that the canals are never actually dried after the irrigation, and the treatment will be prolonged indefinitely. Bichloride of mercury irrigations invariably keep up discharge, if persisted in, due to the irritation of its constant presence in the canal. Haskins has found that active cultures of the bacillus Bulgaricus will promptly overcome offensive discharges in most cases, and when the membranes are thickened the cultures frequently restore them to a healthy color after a very few applications. He employs suction with a small cannula to remove all secretions from the canals, tympani, and attics, and as soon as the offensiveness disappears sufficient drying powder—aristol or nosophen with compound stearate of zinc or boric acid—is blown in to fill the inner portion of the canal. At subsequent visits the canal is cleaned with suction, or alcohol, or cotton applicators if there has been no secretion, and is again dusted, and the patients are told to do nothing except to wipe out any secretion that may come.

In private practice Haskins has yet to see a case that does not dry up and remain dry under this method of treatment, when combined with proper nasal care.

THE ACTION OF POTASSIUM AND SODIUM IODIDES AND OF THE IODINE ION ON THE HEART AND BLOOD-VESSELS.

The *Bulletin of the Johns Hopkins Hospital* for September, 1914, contains an article by MACHT on this subject. He thinks from his experiments that the potassium ion produces a relaxation of the blood-vessels and a marked depression of the heart; that the sodium ion has a slightly stimulating action on the blood-vessels and also stimulates the heart; and that the iodine ion is a powerful stimulant to both the heart and blood-vessels, as shown by its action in experiments on isolated organs. The stimulating effect of the iodine ions, however, is greatly inhibited in the intact animal by their chemical combination with the proteids of the blood. Whether the chemical compound thus produced is a stable one, or whether it is a loose one, and slowly breaks up, setting iodine free, remains an open question. If iodine is set free, a stimulating effect is to be expected.

The action of sodium and potassium iodides on the heart and vessels can be best understood from the action of their component factors. Sodium iodide possesses no depressing property, for the sodium ion is a vascular constrictor and a cardiac stimulant, and the iodine ion, in so far as it is free to act, has the same action.

Potassium iodide, on the other hand, clearly shows the depressing effect of the potassium ion on the heart and vessels, especially of the mammals, not only on

isolated organs, but also in the living animals. It is therefore not a matter of indifference which of the iodides is to be chosen for the purpose of depressing the circulation, as, for instance, in case of an aneurism. The above pharmacological analysis of the action of the iodides, furthermore, shows that so far as experimental evidence goes, the iodides possess no special virtue of lowering blood-pressure, but that that effect is really due entirely to the potassium, and could be produced even more efficiently by other potassium salts.

NITROUS OXIDE AND OXYGEN ANESTHESIA.

Northwest Medicine for September, 1914, contains an article by GEARY in which he endeavors to enumerate the many advantages of nitrous oxide oxygen anesthesia. They are, in his opinion, as follows:

1. Comfort of the patient during the period of induction and elimination, plus the absence of postanesthetic vomiting. The patient passes quickly and very quietly into deep anesthesia, and in the majority of cases surgical anesthesia may be induced within three minutes.

2. It has practically no odor, and when administered to the patient warm, with oxygen in the proper percentage, he is hardly aware that he is taking an anesthetic, especially if he has ever taken ether or chloroform.

3. Nausea rarely occurs when there are no other nausea-producing factors.

4. It is not irritating to the respiratory passages nor to the kidneys.

5. It does not cause fatty degeneration of the liver cells, and has no effect upon the lungs, provided it is administered warm.

6. It does not produce any harmful effects upon the phagocytes, and is, therefore, indicated in infections.

7. The patient is fully awake and in possession of his mental faculties within a few minutes after the anesthetic mask is removed.

8. Subsequent administration has, as a rule, no harmful effects.

9. Its administration is indicated in patients suffering from infectious diseases and those having a low resisting power.

10. Its rapid elimination from the system. The rôle of shock is far less than that of ether or chloroform.

11. The patient is plunged into a deep surgical anesthesia within a few minutes, passing through the stage of excitement very quickly.

12. It does not produce an accumulation of mucus and saliva.

The disadvantages of this anesthesia are very few in the hands of the highly skilled anesthetist, and they should be looked upon by the modern surgeon not only from a scientific point of view, but from the patient's standpoint and that of a good prognosis. They may be enumerated as follows:

1. To obtain the best results it requires a trained expert who fully understands the action of the two gases, the symptoms of the patient, the fundamental principles of anesthesia, and the minute adjustment of the apparatus.

2. Deep relaxation in some cases is not easily produced.

3. It requires an expensive and accurate apparatus for its scientific administration, and one that is equipped with an ether attachment, which ether may be given if the occasion demands it.

4. The anesthesia is somewhat lighter and more transient than that produced by chloroform or ether.

5. It requires much watchfulness and skill on the part of the administrator to produce an even narcosis.

6. Narrow zone of anesthesia with consequent uncertainty of muscular relaxation and freedom from reflex movements.

As a rule, a child of only a few years of age is not a good subject for nitrous oxide and oxygen. Children are hypersusceptible to both nitrous oxide and oxygen. In other words, they are easily asphyxiated even from a small quantity of nitrous oxide, and they readily respond to an overdose of oxygen, thus bringing them out of the anesthetic.

ADRENALIN IN THE TREATMENT OF CHOLERA.

In the *Berliner Klinische Wochenschrift* of October 26, 1914, LICHTWITZ of Göttingen, after pointing out that Asiatic cholera is comparatively unknown amongst German physicians, goes on to consider its therapy, making special mention of the value of adrenalin. He points out that when cases of cholera reach the algid stage the mortality usually amounts to 80 per cent and that it is exceedingly important to maintain not only the warmth of the body and urinary secretion, but also to combat circulatory feebleness. He believes that the remedy which does this most quickly and surely is an intravenous injection of one cubic centimeter of the 1/1000 solution of adrenalin, and in from 500 to 1000 cubic centimeters of normal salt solution. This injection may be repeated to the extent of one-half a liter every three or four hours.

THE USE OF ANTITOXIN IN DIPHTHERIA.

WOODY, in the *Journal of the American Medical Association* of September 5, 1914, after treating many thousand cases, says that the following indicates just what the writer means by large doses, and the doses he is accustomed to give:

No case of diphtheria, however mild, should receive less than 10,000 units.

Both tonsils well covered with exudate, of one or two days' duration, from 30,000 to 60,000 units.

Both tonsils well covered with exudate, with palate, uvula and nose involved, of three days' duration or thereafter, from 150,000 to 300,000 units.

Nasal cases, simple, 20,000 units.

Nasal cases, with marked symptoms of toxemia, from 50,000 to 150,000 units.

Laryngeal cases, from 30,000 to 45,000 units.

Laryngeal, in combination with other varieties, should mean a corresponding increase in dosage.

The theoretical advantages of large doses have been stated. One practical advantage also is the avoidance of the pain and discomfort of frequently repeated doses. What are the objections which might be urged against the use of large doses?

1. Such an amount of antitoxin might prove harmful to the patient. This is disproved by actual experience. Untoward results from the use of diphtheria antitoxin have followed the use of moderate or even small doses just as often as after the use of large ones. Indeed, it has been shown that such a result is not due to the antitoxic bodies themselves, but to the serum alone. There is then a great possibility that such after-effects might be avoided entirely, certainly minimized, by the higher concentration of the antitoxin.

2. The possibility of anaphylactic shock. In the writer's experience this is extremely rare. Its occurrence is of such great rarity that it cannot be allowed to influence us in the least. Too many lives are lost by too little antitoxin being given to allow a theoretical possibility to keep us from making a cure.

Local sloughing from the bulk of the serum is very rare and will be avoided entirely by further concentration.

The writer's actual results show well in the accompanying table.

RESULTS IN AUTHOR'S CASES.

Year.	No. of cases.	Deaths.	Per cent.	Dosage.
1908	1426	127	8.55	Very small.
1909	2153	144	6.69	First year large doses were used.
1910	1870	120	6.62	Larger doses, about as used in 1909.
1911	1895	130	6.86	Doses smaller than in 1909 and 1910.
1912	1676	101	6.02	Larger doses used.

The advantages of large doses are really greater than would appear from these statistics, which include deaths from all types of diphtheria.

The benefits to be derived from large doses are less apparent in the treatment of laryngeal diphtheria than in any other form of the disease. This is due to the fact that practically all cases of this variety are sent

to the hospital only when far advanced and because the condition then to be combated is not a toxemia, but rather a physical one, due to the location of the membrane. The writer has to deal with principally a mechanical obstruction to the intake of air resulting in insufficient oxygenation. These deaths are due to asphyxia and exhaustion or to bronchopneumonia, and not to the toxemia of diphtheria.

In the writer's tables this number of laryngeal cases always influences the death-rate. Were he able to show the results of large doses of antitoxin when the toxemia alone must be dealt with, his figures would be even more favorable.

In the septic types, aside from the great satisfaction of feeling that the doubt as to the ultimate outcome has been set aside, the writer has also the comforting knowledge that by the use of large doses of this specific he has brought to a minimum the chances for the development of that most dreaded of all complications, postdiphtheritic paralysis.

The occurrence of serum sickness and serum rashes is not a bar to the use of large doses. The rashes, however, are frequent, having occurred in 43.4 per cent of 1000 carefully analyzed cases.

Of these, 0.3 per cent was scarlatiniform, and 1 per cent morbilliform. In 11.2 per cent no variety was stated, and in 30.9 per cent the rash was urticarial. The appearance of the rash was as early as a few hours and as late as several weeks. The writer has never observed dangerous or alarming serum sickness, though a few of the patients have become painfully ill and remained so for as long as a week.

Since, then, there is no bar to the use of large doses, there remains but a summary of the writer's results with their use. These results are:

1. Prompter local cure.
2. Quicker improvement in the patient's general condition.
3. Permanence of curative action.
4. Avoidance of complications.
5. Reduction of mortality.
6. Harmlessness of large doses.

The writer doubts, indeed, whether he has as yet used diphtheria antitoxin in doses that give its full therapeutic efficiency.

THE EARLY DIAGNOSIS AND TREATMENT OF MANIC DEPRESSION.

Writing in the *Boston Medical and Surgical Journal* of September 3, 1914, RING points out that while confidence in the doctor and a happy environment are important, the writer does not believe that psychotherapy can go further than this in manic depression. Psychoanalysis should be tried in suitable cases, as good results have been reported, but these cases were doubtless hysterics and not manic depressions; hysteria may simulate anything. The remainder of the treatment is physical and may be summarized as follows:

1. Rest in excess of apparent physical need. This is true of practically all cases, but especially those who are exhilarated. It is a good plan to have breakfast in bed and remain there until the morning treatment is given. The patient should be put to bed again in the afternoon for one or two hours. Many patients will say that they cannot sleep. This does not matter; they can get muscular rest and relaxation. Again some will say that it prevents sleep at night. This is rarely true; all these cases suffer much from insomnia, and this additional rest favors sleep at night. Here the writer wants to enter a plea against the erroneous habit of sending these cases traveling around the globe. Their weakened state rarely stands travel well, and the writer could cite many cases in which this advice has proved not only expensive but harmful, and been the means of shaking the confidence of the family in their medical adviser. Manic depression is a bodily disease primarily and should be treated as such. Too much diversion is harmful.

2. Excess of fresh air. The afternoon rest may well be taken on a cot out-of-doors, as an excess of fresh air is an essential of the treatment. States of autointoxication have often been likened to a choked furnace, and certainly a forced draft with

an excess of oxygen does much for these cases. For this reason as much time as possible should be spent in the open air.

3. Diet. This should be a fruitful field. Unfortunately, though much work has been done upon it, nothing of definite usefulness has been demonstrated. Each case must, therefore, be a law unto itself, applying general dietetic principles. Commonly digestive disturbances are among the earliest symptoms, and emaciation is soon marked, so that as soon as one has decided that there is no organic error in the alimentary tract, it is usually best to give an excess of nutritious food, avoiding only what has been known previously to disagree with the patient.

4. Exercise. Massage, vibration, Faradic electricity, and walking should all be used in their proper places. In the postural cases with visceral ptosis the exercises suggested by Dr. Joel Goldthwait and his colleagues should be practiced. The two most important of these are hyperextension and prone hanging. Hyperextension is accomplished by placing a thin, firm pillow just below the shoulder-blades, the patient lying extended back downward on a bed. This pillow throws up the ribs, allowing the viscera to fall back upon the diaphragm, thus giving the stomach contents the benefit of its churning motion and reducing the trapping of food at the pylorus. It also makes deep breathing easier by putting the ribs in a position advantageous to the traction of the lateral chest muscles. This position should be assumed for from ten to twenty minutes after meals. Prone hanging in the knee-chest position or some modification of it—*i.e.*, lying face down with the legs and lower trunk resting on the edge of the bed and the chest and head inclining downward on a slightly lower stool. This serves the same purpose of throwing the viscera upwards, but in addition allows them to hang away from the large vessels, thus theoretically at least allowing a freer splanchnic circulation.

5. Further to promote the tone of the splanchnic and sympathetic apparatus, a large incandescent lamp (from 50 to 300 c. p.) may be played upon the abdomen until the superficial vessels are thoroughly engorged—*i.e.*, from seven to fifteen minutes—and this immediately followed by a large, cold wet compress, left on for about an hour until it steams. This makes an excellent treatment for the afternoon rest period.

6. The question of elimination is of extreme importance; most of these cases have suffered for a long time from constipation, and this must be energetically and persistently treated. Very frequently there is evident stagnation with excessive gas distention. Each one will have his pet way of treating this situation. The writer has found in milder cases cascara sagrada or phenolphthalein and properly given high enemas sufficient, while in severe obstruction with palpable scybala he has resorted to castor oil. For the excessive gas nothing is so useful as hypodermic injections of eserine sulphate, one-sixtieth grain. To secure an active elimination through the skin, the prolonged tub bath is simplest and best. It should be given at 96° F. for an hour or more at bedtime in the mild cases. It is a useful sedative to patients who have no arteriosclerosis. These latter are made worse by it. Severe cases with active mania may be tubbed for several hours on a stretch with much benefit. After prolonged tubbing the patient must be dried and rubbed with oil of some sort and urged to rest.

The urine rarely gives any trouble except that of concentration from insufficient intake of liquids, and for this reason water-drinking should be prescribed in definite quantities at stated times. Where the patient refuses water it should be given as high saline milk enemas. Indican is generally found in excess, and the breath frequently has an acetone odor similar to the diabetic. This symptom should be promptly met by the administration of bicarbonate of soda, five to ten grains every two hours.

Drugs.—As one would expect, with the present ignorance of the basic error we have no specific, but must fall back upon symptomatic or empiric prescribing. In depression the writer has thought he saw some

benefit from the prolonged use of gold. In the emaciated and hallucinated cases, small doses of arsenic, usually Fowler's solution, have seemed useful. This mixture has long been used with benefit in diabetes, and is certainly useful in patients who are on the verge of manic-depression breakdown.

Sedatives and hypnotics must be used in most cases. If the tub bath will accomplish the purpose, so much the better; but this is only in the early cases. Malonal, veronal, and bromide have served the writer best. All of these cases suffer from insomnia, usually for some time before other symptoms appear, and this symptom should be combated. It not only wears out the patient and reduces resistance, but is also a great source of discouragement. Not that the writer would have it thought that the mere producing of sleep will cure manic depression, but it is an avenue to the patient's confidence and an important symptom in directing study and treatment. In severe and persistent excitement nothing is so useful as a one-thirtieth grain of apomorphine, though occasionally a one-two-hundredth of hyoscine may be of equal service.

BROMIDE RASH.

WEISS, in the *Journal of the American Medical Association* of August 22, 1914, sums up this subject as follows:

1. Drug eruptions may simulate almost any known skin affection.

2. A skin eruption starting suddenly without any prodromal symptoms is almost sure to be a medicinal eruption.

3. The violence of development, the preponderance of the local over the systematic disturbances, is characteristic of drug eruptions.

4. The brevity of the acute stage and the quickness of defervescence constitute a notable asset in diagnosis.

5. The usual four stages of the acute contagious exanthems—namely, the prodromal, the eruptive, the fully developed and retrogressive, and the desquamative—are wanting.

6. The temperature never rises to the point shown by the acute exanthems, and the affection of the mucous membrane is never so severe.

PITUITARY EXTRACT IN OBSTETRICAL PRACTICE.

In the *Monthly Cyclopedia and Medical Bulletin* for August, 1914, WATSON states that when given about two minutes before Cæsarian section pituitrin has a marked effect in diminishing the loss of blood. A number of operators have used it for this purpose. In the Tarnier clinic it was found to be inefficient in two cases out of four, and in these ergotin gave good results. Fischer injected it directly into the uterine wall, and the uterus at once contracted and all hemorrhage ceased.

Pituitrin may also be used in osteomalacia. The influence of pituitrin upon the growth of bone is well known. It is stated, however, that while it may relieve the pain, it does not effect a cure.

As a galactagogue, the author used it in several cases. It was difficult to estimate the exact effect produced, but in all cases the children, who previously appeared to be hungry after feeding, were satisfied and quickly gained in weight.

In some women, more especially elderly primiparæ, pituitrin appears to have no effect at all. In others it may produce general symptoms, cardiac distress, vertigo, tachycardia, and respiratory difficulty, which have been reported by various writers. The same set of symptoms was observed by Hofbauer after intravenous injection, and it may be that some of those results following subcutaneous or intramuscular injection were due to the needle entering a vein.

In its action on the uterus pituitrin may set up tonic or tetanic contractions, and may cause a spasm of the internal os. The first contraction after the injection is given is usually a prolonged one. Hamm, for instance, reports a case in which four injections were given. After the second the first pain lasted eight minutes, after the third eleven minutes, and after the fourth seven-

teen minutes. After this first powerful contraction the uterine action is usually normal. When the contractions are very powerful and painful they may be controlled by the administration of an anesthetic, or by the use of morphine or omnopon. The ordinary scopolamine-morphine method may be successfully used along with pituitrin.

Spasm of the os may occur in cases of abortion, when the drug is given for the induction of premature labor or early in the first stage. Heil reports a case in which the birth of the second of twins was arrested, owing to spasm of the os following pituitrin injection. Nagy had to incise the cervix in one case, owing to spasmodic rigidity; while Roemer had to remove the placenta manually in two cases, owing to stricture of the os. In a case of sacculated retroflexed uterus, with forward displacement of the cervix, Koch inserted a hydrostatic dilator and gave 1 Cc. of pituitrin. Strong contractions occurred, but no dilatation of the cervix took place. Apparently there was a spasm of the os. Cæsarian section was ultimately performed, but the child died.

A number of cases have been reported in which pituitrin was given, and in which atony of the uterus occurred after the termination of the third stage. In most of these the last injection had been given a considerable time before the birth of the child. When the last injection has been given within a short time of the birth of the child and placenta, the uterus usually remains firmly contracted. If there is any tendency to relaxation the ergot preparations usually act well.

Any bad effects of pituitrin on the child are due to the prolonged contraction of the uterus. In nearly all cases marked slowing of the fetal heart is observed, but usually the child is in no danger. Nagy had to deliver rapidly with forceps in one case in order to save the child. Koch and Spaeth report death of the child in breech presentation after pituitary injections. In both cases delivery was rapid and easy.

Unusual effects have been mentioned in a few cases. There was a spasm of the glottis in one case reported by Hamm, and contracture of the extremities, lasting for twenty-four hours, in a case reported by St. Antechi and Zaczewski. It is difficult to say whether these were due to the pituitary or not.

On the whole, the chief field of usefulness of pituitrin is in the first and second stages of labor, when there is delay due to feebleness of the pains, alone or when combined with other complications, such as malpositions of the head, malpresentations, multiple pregnancy, slight narrowing of the pelvis, etc. It gives good results in many cases of postpartum hemorrhage, but is not superior to the various preparations of ergot. It has the power, however, of sensitizing the uterus so as to allow these preparations to act more powerfully, the combination being most effective.

VACCINE TREATMENT IN PERTUSSIS.

HARTSHORN and MOELLER, in the *Archives of Pediatrics* for August, 1914, reach these conclusions from the literature reviewed; 1445 cases were observed and reported:

1. There is not a universal indorsement of pertussis vaccine.

2. A variety of vaccines are being used without definite knowledge of the bacteriology of the individual cases treated.

3. There is a striking lack of negative reports.

4. Apparently the vaccine is harmless in uncomplicated cases.

5. There has been established no definite standard for dosage or for treatment.

6. The dosage generally used has been apparently too small.

7. The course of the disease in the majority of cases reported has not been much under six weeks.

8. Its value as a prophylactic agent is still undetermined.

9. It is generally conceded that the earlier the treatment is given the better the result.

10. The vaccine treatment is worthy of a more extensive trial.

Conclusions drawn from the treatment

with vaccine of 18 of Hartshorn's and Moeller's cases of pertussis:

1. A certain number of cases will respond favorably to the commercial vaccine.

2. Where a commercial vaccine has not proved successful it would seem desirable to try an autogenous vaccine.

3. The initial dose should be at least 50,000,000 in older children, and this may be doubled at subsequent treatments up to 400,000,000 at five-day intervals. Further observations regarding dosage indispensable.

4. A certain number of cases will not respond favorably to a vaccine, and in those it should not be continued after a trial of four doses.

5. The relative value of the combined vaccine as compared to the single culture vaccine is undetermined.

6. In that the improvement in a few cases was immediate and striking, it seems fair to suggest but not to recommend its use.

A CASE OF ACUTE POISONING BY BETA-EUCAINE.

WAY, in the *Journal of the Royal Army Medical Corps* for August, 1914, says that as poisoning by beta-eucaine is so rare he ventures to report a case which occurred while he was doing a circumcision on a young healthy soldier. The solution of beta-eucaine and sodium chloride had been freshly prepared and a few drops of adrenalin added. A quantity of this solution containing rather less than two grains had been injected into the body and root of the penis. As the operation was about to be started the patient became very quiet and pale, and said he felt faint. His limbs began to twitch, and the little finger of the right hand became tightly clenched. His breathing became slow and labored, the pulse-rate was increased, and the pupils contracted almost to the size of a pin's point. He became very much cyanosed, his breathing nearly stopped, and he completely lost consciousness. Artificial respiration was carried out and strychnine injected. Under this treatment he soon revived and the operation was carried on. For the next twenty-four hours he was very drowsy and sweated profusely; otherwise he made an uneventful recovery.

The interest of the case lies, the writer thinks, in (1) the rarity of such poisoning; (2) the indication that the patient should never be left after the anesthetic has been given; (3) the fact of the pupil being contracted, whereas in cocaine poisoning it is dilated; (4) the small amount of the drug which caused such a sudden and severe case of poisoning, the dose being five to ten grains.

TREATMENT OF TONSILLITIS.

LAPAT, in the *Medical Record* of August 29, 1914, says that for the past year and a half he has been laying a great deal of importance on the early and active local treatment of this disease, looking upon it in the first few hours as a local infection and treating accordingly by applications which would tend to destroy the action of the bacilli. The drugs which have given him excellent results are hydrogen peroxide and a solution of the tincture of iodine, which is 5 per cent stronger than the official tincture. A number of those cases which the writer has seen early he has been able to abort. The hydrogen peroxide he uses on a cotton applicator to remove the patches from the tonsils, then with another applicator he applies the iodine into the crypts, taking care that none of it flows into the pharynx. These applications are made twice a day on the first two days, and at the same time the patient uses a spray of ichthyol as follows:

Ichthyolis, 8.0;
Olei anisi, 0.2;
Aqua anisi, ad 60.0.

M. Sig.: Shake well and use as a spray every two hours.

This is a mixture used by Dr. J. Abraham of the Polyclinic, and the writer finds that it has an excellent effect on the reactionary inflammation in the mouth and pharynx.

The general treatment should be carried out as in any other acute infection; the patient must be put to bed and kept there until all symptoms have disappeared. Calomel is

given at the outset, diaphoretics for the fever, and the various complications should be treated as they arise. It is especially important that one should be on the lookout for the slightest sign of joint implication, as most of the serious results have been due to this cause.

THE BIOCHEMICAL ACTION AND CHEMOTHERAPEUTIC STUDIES OF CHRYSAROBIN AND ALLIED SUBSTANCES.

SCHAMBERG, RINGER, RAIZISS, and KOLMER in the *Journal of the American Medical Association* of August 29, 1914, state that they have endeavored to determine the changes which take place in the skin when chrysarobin and certain allied products are applied. It is a well-known fact that chrysarobin produces a curious mahogany-colored discoloration of the skin which lasts until an exfoliation of the stained horny cells takes place. It would appear that the greater the degree of staining, the more beneficial is the effect of the drug on the disease. They have shown by a series of experiments, which will be detailed in full length elsewhere, that chrysarobin has a powerful affinity for certain elements of protein. Indeed, the staining of the scales by chrysarobin produces a firmer union than the staining of the scales by any known aniline dyes. The staining of the skin appears to be intimately associated with the process of oxidation. Chrysarobin is powerfully reducing, and in undergoing oxidation abstracts oxygen from the protein of cells, for they have demonstrated that the oxidation can go on in the absence of air in a hydrogen atmosphere. They believe from their experiments that the effect of chrysarobin is in large part due to two influences: (1) the firm union with the protein of the epithelial cells, and (2) the abstraction of oxygen. It is quite possible that this may explain the favorable influence of the drug in psoriasis, for the action referred to may restrain the great proliferative activity of the epidermal cells which characterize this disease.

Some investigators, chief among whom was Unna, maintained some years ago that chrysarobin produced its favorable influence in psoriasis by abstraction of oxygen, the drug being oxidized into chrysophanic acid, a reddish-brown substance. The investigations which they have carried out seem to support the view that the reducing power of chrysarobin is of great importance in influencing its therapeutic efficacy. As has been stated, this action and the remarkable chemical affinity of chrysarobin for protein, particularly for the keratin of the skin, appear to be in large part responsible for the beneficial influence of this drug. Psoriasis scales which are incubated with a watery suspension of chrysarobin at 37° C. (98.6° F.) are deeply stained by the drug. The chemical combination is so firm that it is impossible to remove its coloration even by prolonged boiling with glacial acetic acid. The chemical combination of chrysarobin with protein is apparently stronger than that of any known aniline dye.

Recent investigations into the chemical constitution of chrysarobin have revealed the fact that it consists of a number of chemically allied substances. Following the work of certain other chemists, they have isolated the two important ingredients of chrysarobin, chrysophanol-anthranol and emodinol. They have tried out these substances clinically and have found that emodinol exerts no therapeutic effect whatsoever, while chrysophanol-anthranol has a favorable influence, but inferior to that of crude chrysarobin. They then tried to isolate by fractional extraction the therapeutic active parts of chrysarobin; the fractions, however, were always inferior to the whole drug. Compounds of chrysarobin in which the hydroxyl group was combined with the acetyl radical, acetyl-chrysarobins, were prepared and tested out therapeutically. They found these compounds likewise inferior to chrysarobin. A number of other compounds in which the hydroxyl groups of chrysarobin were partially or completely oxidized were therapeutically of little or no value; in general, it can be stated that any change in the chrysarobin molecule affecting the hydroxyl groups diminishes the

therapeutic activity on the skin. These investigators have produced a certain derivative of chrysarobin in which the hydroxyl groups appear to remain unaltered which has greatly interested them. This new drug has been tried out by them and other dermatologists to whom it has been supplied, and the general feeling is that it is superior to chrysarobin. It is also preferable to chrysarobin in that it is much cleaner and freer of disagreeable staining properties. The mode of standardizing the preparation of this drug has not been satisfactorily concluded, and they therefore delay publication on this matter until a little later.

THERAPEUTIC ARTIFICIAL PNEUMOTHORAX IN PULMONARY TUBERCULOSIS: A REPORT OF SIXTY-TWO CASES.

LYON in the *Boston Medical and Surgical Journal* of August 27, 1914, says that of the sixty-two patients treated in his series two were incipient ones, and treatment was given to relieve frequent hemoptysis. The lungs in both instances have been collapsed since April, 1913, and February, 1913, respectively. There has been no recurrence of the hemoptysis, and for the past several months the sputum has been negative of tubercle bacilli. It is the writer's intention to discharge both these patients at an early date. There were thirty-one cases in the moderately advanced stage of the disease, two in which the prognosis was questionable, seventeen unfavorable, and twelve bad. In three instances the lung was collapsed to relieve hemorrhage and the experiment was successful. The treatment had to be discontinued with two of the patients on account of a recrudescence of the disease in the opposite lung. One developed a severe hemoptysis in the uncollapsed side and the treatment had to be abandoned. Four had to be discontinued on account of a recrudescence in the opposite lung, in one on account of neurosis, in three because the writer was unable to introduce a sufficient amount of gas to expect any results. In two instances the treatment was abandoned on account of the occurrence of pleural shock; on both occasions when the writer attempted to introduce gas the patient became unconscious. The treatment was discontinued in still another case which developed appendicitis. One died following a spontaneous pneumothorax, and the treatment was discontinued in another case on account of adhesions at the base of the opposite lung, causing marked dyspnea.

Of the fifteen remaining patients, five have been discharged and are doing well; three of this number are at present employed and are working eight hours per day. The treatment is being continued satisfactorily in the remaining ten cases, many of whom are soon to be discharged.

The greatest number of injections made in a single case was 28, the maximum amount given was 1700 Cc., and the minimum amount was 50 Cc., with the exception of the patients suffering from pleural shock. Here none was given. In the twenty-nine far-advanced cases the prognosis was unfavorable in ten, and bad in nineteen. The treatment was discontinued in eight instances on account of recrudescence in the untreated side, four on account of neurosis, ten on account of dense unyielding pleural adhesions. One died of acute cardiac dilatation and pulmonary edema. Of the six remaining patients, one has been discharged as arrested and is working in the institution eight hours per day, three are progressing satisfactorily, the treatment was discontinued in another instance on account of pregnancy, and the one remaining is a spontaneous pneumothorax, and the collapsed lung has been maintained by occasional introductions of gas.

When the results of the treatment are analyzed, it must be understood that in almost every instance the prognosis was not encouraging and was, in most instances, exceedingly bad. Of the sixty-two cases treated, fifty-eight were bilateral and four were unilateral. The treatment was discontinued in thirteen cases on account of dense unyielding pleural adhesions, and in twelve on account of recrudescence of the disease in the untreated side.

A NOTE ON ADRENALIN CHLORIDE IN THE TREATMENT OF SPASMODIC ASTHMA.

In the *Lancet* of August 15, 1914, WALLER states that the following notes may be useful as supplementing Dr. W. Miller's experiences with adrenalin, as related in the *Lancet* of July 18. Waller has employed hypodermic injections of adrenalin chloride in cases of spasmodic asthma for the last five years, having been led to adopt the treatment by the perusal of an article in an American medical journal. The preparation used has been Parke, Davis & Co.'s solution of 1 in 1000, with 0.5-per-cent chloretone, in doses of 5 or 6 minims to begin with, never more, and these doses have never been followed by any untoward consequences; on the contrary, the relief to the patient has invariably been prompt, grateful, and in many instances lasting. The American writer of the above-mentioned article put forward as an additional recommendation the fact that in using adrenalin in this complaint smaller and smaller doses would be found efficacious, instead of increasingly larger administrations as might be expected. This statement has been fully supported in Waller's experience, and even such a minute dose as 1 minim diluted with water has been successful in promptly cutting short an attack in a chronic case.

During the last five years Waller has had opportunity of closely observing the effect of the drug hypodermically administered to a chronic asthmatic, a professional gentleman forty years of age. Until adrenalin was tried in the spasm nothing gave him relief, even morphine itself proving unsatisfactory. The benefit obtained by him is invariably immediate, although Waller can confirm Dr. Miller's observations as to the patient's pallor and the smallness, rapidity, and slight irregularity of the pulse for a few minutes immediately after the injection. The patient's own description of his sensation is that he feels "a little cold and inclined to shiver, somewhat shaky in the knees, and a peculiar empty feeling in the chest." These soon pass off, and the dominant sensations then are a delightful sense of relief from the dyspnea and a desire for sleep. The sleep is always light, refreshing, and dreamless, and Waller has never known it followed by undesirable or unpleasant consequences. This patient has been free of his ailment for weeks and months at a time. Occasionally during a bout Waller has had to give him two injections in the twenty-four hours, but Waller has always been able to decrease the dose, and has never given him more than 6 minims or less than 2. It is now more than six months since the patient has had the slightest return of his trouble, or has received or required an injection.

Waller is aware that the continuous administration of large doses of suprarenal extract is followed in animals by arteriosclerotic changes; but the amount of the gland extract injected in the above doses being so infinitesimal this objection cannot, he thinks, be urged against its employment in asthma. Waller has always injected the preparation subcutaneously, never intravenously, and he has never found that any benefit was to be obtained by even quite large doses given by the mouth.

THE PLACE OF THE ROENTGEN RAY IN THERAPEUTICS.

The *Journal of the American Medical Association* of August 29, 1914, contains an article by JOHNSTON in which he reaches these conclusions:

1. The Roentgen ray is of distinct value in the treatment of a number of conditions.

2. It can never supplant, but can and does supplement surgery to a valuable degree.

3. The results to be expected depend on the employment of a correct technique, which implies the ability to prescribe correctly and administer the necessary dosage at the necessary time in each individual case.

4. The Coolidge tube has placed in the hands of the profession an instrument capable of great good if carefully and intelligently employed.

5. The value of radium as a therapeutic agent should be no longer disputed.

6. The physician employing these various agents must be thoroughly familiar with the possibilities of present-day surgery as well as expert in his own technique in order that his patient may obtain the benefit of everything that science has to offer.

7. Physicians and the public must never forget that every case of malignancy remains for a certain length of time after its inception a curable disease by proper surgical procedure.

SOME OBSERVATIONS ON THE INTENSIVE NASCENT IODINE TREATMENT.

The *Clinical Journal* of August 19, 1914, has in it an article by REEVE on this subject. For the benefit of those who may not have, up to the present, become acquainted with the treatment, the writer gives, very briefly, the theory upon which it is based, after the lines of that published by Dr. Curle, of Glasgow, in the *Practitioner* of December, 1912. Chlorine and iodine belong to the same chemical family, but the salts of these elements vary considerably in their action on the body. We are all used to taking sodium chloride, yet none of us are acquainted with symptoms which the writer proposes to term "chlorism." Again, we are all acquainted with the irritating effect of chlorine gas. Sodium chloride is a very stable salt, and as far as the writer knows there is no element in the body which can displace chlorine from the sodium radicle. On the other hand, if he gives small doses of sodium iodide, the patient suffers from a class of symptoms which the writer terms iodism. Binz has proved that the symptoms obtained by exposing patients to iodine vapor exactly correspond to those obtained by giving small doses of iodine salts. The writer knows that sodium iodide and potassium iodide are not nearly as stable salts as are the chlorides of these metals.

It seems reasonable to argue that the symptoms which are termed iodism are due to the splitting of the salt into iodine and a fresh sodium salt. The writer has seen the effect of giving potassium iodide in doses varying from ½ gr. hourly or four-hourly up to 300 grs. three times a day. The symptoms of iodism are always more marked when small doses, *i.e.*, ½ gr. hourly, are given, than when large doses are given. It would seem, then, that the quantity of potassium iodide which can be split up in the blood in a given time is limited. Yet if the action is a chemical one, that quantity should be definite and the same whatever dose of iodine is administered. If the quantity of iodine liberated in the blood is constant, why should we get more symptoms of its presence from small doses than from large doses? The only factor which is different in the two cases is that in the large doses there must be an excess of combined potassium iodide in the blood. Iodine is only slightly soluble in water to the extent of one part in 7000. If the solution be exposed to air the iodine readily volatilizes. If, however, potassium iodide be added to the solution, it prevents volatilization of the iodine, and also increases its solubility in proportion to the amount of iodide present. There are many theories given as to how this dissociation takes place, but the writer will only refer to one, that arrived at by Dr. Curle. Hemoglobin has the property of taking up ozone from the air, and transferring it to oxidizable substances in the blood; it can also convert oxygen into ozone. The affinity of ozone for potassium is greater than that of iodine even in solutions iso-alkaline with blood serum. The writer is warranted, then, in concluding that the potassium is oxidized by ozone and iodine liberated. This reaction is dependent on respiration, and therefore must proceed at a uniform rate, however much potassium iodide there may be in the blood. The rate of the reaction and, therefore, the maximal quantity of iodine liberated in a given time has been worked out by experimentation, using iodism as a control. It has thus been found that iodism is usually most intense when 3 to 4 grs. of potassium iodide are administered to a healthy person every four hours, and that double that dose causes a

disappearance of the symptoms. This has been confirmed by Sir Lauder Brunton.

It follows, then, that large doses of potassium iodide, owing to the presence of a large excess of undissociated iodine, have the least antiseptic action in the blood, and also that in doses under 4 grs. the action of potassium iodide is almost that of free iodine introduced into the blood, whilst its action in doses over 4 grs. is that of iodine held in solution by varying proportions of potassium iodide.

In small doses we have effects of iodine vapor, indicated by stimulation of secreting structures to increased secretion, and of absorbent structures to increased absorption, hence small doses of iodine cause increased watery expectoration, which diminishes when large doses are given.

It is interesting in this connection to consider the medium dose so often used, *i.e.*, 10 grs.; for at the end of four hours, with 4 grs. disintegrated, it yields 3 grs. of iodine, and 6 grs. of iodide to keep it in solution, proportions identical with those in Gram's solution, and therefore antiseptic; 10 grs. may, therefore, be considered the largest dose of potassium iodide which has antiseptic properties, without causing iodism. The treatment aims at increasing the quantity of free iodine in the blood, yet maintaining the same proportions of free iodine to iodide as are present in Gram's solution. This means an increase in the dose of potassium iodide, the iodide being liberated in the blood by artificial means, using chlorine water to oxidize the potassium iodide.

If we can administer just sufficient chlorine to decompose four-tenths of the iodide, we shall produce a solution in which iodide is present in double the amount of iodine—proportions which we have seen do not cause iodism, and yet produce a solution which will part with its iodine sufficiently to be antiseptic. Should we happen to carry disintegration a little further, and liberate the iodide, we have a solution in which iodine and iodide are in equal proportions, a combination known to be even more antiseptic than the previous one, with only a minimum risk of iodism. The rule then is first to administer the iodide, and after a time for absorption the chlorine solution in successive portions, at intervals, until slight symptoms of iodism appear.

Twenty grains of potassium iodide are given in one-half pint of water at breakfast time; four hours later 1 ounce of chlorine water is given in one-half pint of lemonade. This dose is repeated at two-hourly intervals until sufficient has been given. In starting, 3 ounces of chlorine is administered daily. This produces signs of iodism, which pass off after the first four or five days. There is a feeling of cold in the head, and headache. The symptoms appear toward midnight, but the early morning dose of potassium iodide soon relieves them, and after a week or ten days the patient feels no ill effects from the treatment. Some patients have no symptoms from the beginning. At the end of three weeks the dose may be increased to 4 ounces of chlorine water, and then to 5, without further ill effects.

The idea is, then, to liberate iodine in the blood. Whether iodine can exist free in the blood even for a fraction of time the writer is not prepared to discuss, but he understands that it can be detected in the blood in the form of an iodate.

Let us suppose that it can exist in its nascent form and try to work out what its effects would be. Iodine when used as a liniment is a powerful irritant and germicide. Therefore we may expect the same effects to a lesser degree by employing it internally, and since it is in the blood every organ, one might say every cell, in the body will react to it.

We know that the thyroid gland secretes iodine, and iodine is therefore a normal constituent of the blood. If we confine ourselves to reasonable dosage, we have little reason to expect any marked changes in a healthy person. Whether such a person exists is to the writer's mind very doubtful, and he ventures to state that there is not one of us who has not some small focus of infection somewhere in his tissues. The effect of this treatment on these dam-

aged tissues can be easily demonstrated. If we take those tissues which can be most easily seen, namely, the skin and mucous membrane, we find an increased inflammatory reaction going on around those tissues. This is well demonstrated in acne. The acne at first becomes more and more defined. Lesions which were only perceptible before treatment with the aid of a magnifying glass become quite easily visible, and form small pustules which eventually discharge and heal. There is an increased flow of blood to the part and, therefore, an increased absorption of toxins.

The same thing occurs in the mucous membranes, in cases in which there is an infection of the pharynx or pharyngitis produced by smoking; there is an increased flow of this mucus, a slight swelling of each focus, and increased discharge. The same thing happens with the nose and its accessory sinuses and also with the ear; old chronic affections which have perhaps given rise to a discharge, for months or even years, or cases which have lain dormant, become lighted up and give rise to fresh or increased discharge. The treatment apparently causes destruction and liquefaction of pathological tissues in the body, and these pathological tissues are either discharged from the body or absorbed.

This has been well brought home to the writer in one or two cases of old healed surgical tuberculosis. One which he might mention, a woman with a tuberculous hip and rib which had remained healed for six years, developed an abscess of eight ounces of pus, which she discharged in seven days, and also another abscess about the size of a duck's egg over her rib, which was slowly absorbed. Also a woman with a tuberculous shoulder, which after a few days' treatment became very swollen and enlarged, and eventually the swelling was absorbed and the joint became normal.

Again, in some twenty cases of children with tuberculous glands in the neck, the glands for the first few days became swollen, but eventually subsided and became so slight that they could only just be felt. In cases of tuberculous laryngitis the swelling and increased redness can be easily seen. In a child aged four, with a tuberculous gland, who had suffered from melena for six months, and whom the writer took to be suffering from tuberculous colitis, the melena was slightly increased at first and was accompanied by large quantities of mucus. The child now seems to be well on the way to recovery.

It seems fair to argue from this that lesions in organs in the body which we are unable to see would react in the same way. The point which the writer is trying to emphasize is that as every pathological tissue in the body obtains for the time being an increased supply of blood, which will mean an increased absorption of toxins, we must expect a reaction on the part of the body to those toxins. The temperature rises generally about the third day, and may remain up for five or six days, but generally shows a decline about the fourth day. During this period the patient will feel tired and slack, with vague pains about the body, and in a few cases a loss of power in the lower limbs.

The writer has no suggestion to make as to the cause of this, but he mentions it as having been told him by five patients out of over 300 whom he has treated. These apparent ill-effects pass off usually before the end of a week, and patients presenting themselves at the hospital after a week's treatment have, generally, recovered so much from their trying experience as to say they feel decidedly better.

From the effects produced on the tubercle bacilli themselves, which the writer fears he has not time to enter into now, he has not the slightest doubt himself that the iodine liberated in the blood is sufficiently strong to act as an antiseptic or germicide.

If this is true there seems to be no reason why this treatment should not be used in any case which is due to some specific infection and cure it. Among the diseases which the writer has treated successfully are the following: Tuberculosis, lungs and joints, glands; syphilis (three); lupus, malaria, mumps, scarlet fever, diphtheria,

gonorrhea, arthritis, rheumatism, rheumatic gout, eczema, pompholyn, acne.

The writer used it in psoriasis without benefit. He mentions only these diseases to show that the treatment has a wide field for work and not as a definite statement that it will cure these diseases, as nearly all his time has been spent on tuberculosis, and he has not had anything like enough experience with other diseases to say what its real value is.

It is important to make sure that instructions are strictly adhered to, and that the patients should be made to thoroughly understand that the two medicines are of little use separately and must be taken very strictly. The chlorine water should be carefully prepared, and the writer finds it very necessary in all cases in private to give full written instructions as to its preparation for the use of the chemists. In several cases he has found patients drinking a weak solution of potassium chloride and potassium chlorate. In one case a patient was given two tablets of potassium idodide, 10 grs. each. These he swallowed without any water and was violently ill. In other cases the same thing has occurred with patients taking their morning dose in ½ ounce water.

In one case a man was given a full dose, 30 grs. of iodide, after breakfast: within half an hour a dose of chlorine water was given. A large dose of iodine was thus liberated in the stomach which made him at once vomit a large quantity of blue fluid and not unnaturally gave him a severe shock, and made him remark he thought the treatment was a little drastic.

Patients sometimes complain that the chlorine water lines their throats: this occurs most often in cases of glandular enlargement. These cases the writer finds do better if they take their chlorine water in ordinary water instead of lemonade. If the physician wishes to give milk at the same time as the treatment the potassium iodide can be given with a glassful of hot milk in the morning, and milk can be given at night after the medicine is finished for the day.

The results obtained are sufficiently good to lead one to expect a cure in early cases and lasting benefit in the more advanced ones.

[We fear that the author of this paper is unduly optimistic.—ED.]

PEROXIDE OF HYDROGEN AND SODIUM SILICOFLUORIDE IN ORAL AFFECTIONS.

HEAD, writing in the *U. S. Naval Medical Bulletin* for July, 1914, tells us that the two effective mouth-washes are peroxide of hydrogen and a saturated solution of sodium silicofluoride. The sodium silicofluoride is beyond question the most effective wash in reducing gum infection around the teeth. Ninety-nine times out of a hundred this wash will almost entirely reduce the formation of tartar and at the same time heal the gums. In one per cent of the cases it causes the gums to heal, but also makes a calcareous brown precipitate on the teeth, the reason for which has not been explained. It is extremely cheap to use, as a pound of sodium silicofluoride, costing 75 cents, will make over 20 gallons of wash. Ordinarily its value in the reduction of tartar cannot be overestimated.

When we come to the use of peroxide of hydrogen as a mouth antiseptic we open a large field where ignorant or unscrupulous commercialism has made the most preposterous claims, but where there is also a very considerable amount of therapeutic value, if it be used in sufficient quantity for a sufficient length of time. According to Paul Bert and Reynard, it was found that all fermentation caused by bacteria was at once stopped by peroxide of hydrogen, while no effect was produced on the enzymes of physiological ferments, such as are found in the stomach or pancreas, so that these tests would indicate that peroxide of hydrogen would have no harmful effect on digestion and yet would restrain the interfering action of microörganisms. It is, however, doubtful if a solution of peroxide weak enough to be held in the mouth for any practical length of time can act in any way

but as an antiseptic, not a germicide. This is particularly interesting in reference to certain oxygen-liberating dentifrices which claim to sterilize the mouth by the development of hydrogen peroxide. Most of these powders are antiseptically inert. However, they need not be inert if they are scientifically compounded. For instance, 10 grains of tooth-powder of the usual commercial oxygen-liberating dentifrice usually yields only enough free oxygen to make 3 to 9 drops of a one-per-cent peroxide of hydrogen solution, and as 5 to 10 grains of powder is the amount of dentifrice sprinkled over a tooth-brush, therefore 3 to 9 drops of one-per-cent peroxide of hydrogen is the full amount of antiseptic available in any one tooth-brushing with the ordinary tooth-powder. This, of course, is ridiculously insufficient. If, however, a tooth-powder is made of 60 parts peroxide of magnesium, No. 200-mesh sieve, 30 parts perborate of soda, and 10 parts soap and flavoring, we have a dentifrice theoretically containing enough free oxygen to make in an acid mouth 120 to 130 minims of fresh one-per-cent peroxide of hydrogen, and while this amount of antiseptic may not be developed, there is certainly enough developed to give excellent clinical results.

After floss silk has been used the teeth should be well brushed with this preparation, and after the brushing is completed the saliva and dentifrice should be freely swashed in between the teeth for a period of two minutes, when it may be spat out. The mouth should not be rinsed with water after the brushing, as the particles of magnesia, being soluble only in acid media, will collect in between the teeth and act as a guard against the formation of acid, which, if it forms, will be immediately neutralized by the soluble magnesium salt which is thus automatically set free. The perborate of sodium used in this dentifrice is a bland salt that can be freely placed in the mouth without caustic action, and in the presence of acid will develop 19 to 20 per cent peroxide of hydrogen. Most of the chalk tooth-powders have a serious destructive erosive action on the teeth, and where this is found to have been the case perborate of soda, with suitable flavoring, will in itself make an admirable dentifrice and mouth-wash, since repeated tests with a tooth-brush, perborate of soda, and saliva on a natural tooth show that this preparation is non-erosive.

A one-per-cent peroxide solution neutralized of its free acid by a little soda also makes an admirable mouth-wash with which the teeth may be brushed and the mouth and throat should be gargled after the process of mechanical cleansing is over. But the wash should be held in the mouth for at least two minutes, a shorter time being of questionable value.

There are a large number of washes and preparations generally recommended, some of which no doubt are of value; but these two antiseptics have been singled out for the reasons given and because they have proved of special value to many patients in the daily routine of their mouth cleansing.

After so much minute explanation it may not be inadvisable to review once more just what the daily cleansing of the mouth should be. The surface in between the teeth should be swept on both sides by floss silk to remove all food and bacterial deposits. The teeth and gums should then be thoroughly brushed, as described, with the dentifrice or antiseptic wash, and the saliva and mouth-wash vigorously swashed in between the teeth for a period of not less than two minutes, so that the thin coating of bacterial film left by the floss silk on the sides of the teeth may be discouraged from growth until the next cleansing. When there is marked gum infection the saturated solution of sodium silicofluoride should be held in the mouth for full two minutes after the procedure just described. This cleansing should be carried out morning and evening.

There is one other point that might with benefit be mentioned. Toothaches from inflamed nerves within teeth, sometimes apparently sound, are so reflected from tooth to tooth that the patient and even the dentist is sometimes at a loss to know the offending member. On account of this difficulty

of diagnosis many useful teeth have been extracted without giving the desired relief. If a simple test were available which would pick out infallibly the tooth containing the nerve or pulp primarily causing the toothache or neuralgia, even if the condition were such that the pulp might not be removed and the toothache so cured, it would be at least possible to extract the right tooth. Where the toothache arises from a dead or almost dead nerve and the infection has been driven through the tip of the root into the gum, causing an acute gum inflammation and swelling, the diagnosis by biting or knocking on the tooth is simple in the extreme, and dentist and patient have no difficulty in finding the offending tooth. But where the pulp or nerve of a tooth has become infected, and the blood-pressure is compressing the nerve filaments of the pulp under most agonizing conditions, the pain reflects into almost every tooth on that side of the face. If, however, a uniform heat can be applied locally to each tooth in succession for a second or two, as may be necessary to obtain the general response, when the offending tooth is reached the reaction is immediate—the toothache either starts at once or is greatly increased, and the cause or causes of neuralgia become at once clear, and are so capable of being treated or removed.

The instrument for such diagnosis is a small electric cautery that is heated just hot enough to char paper. The current always maintains a constant heat so that the stimulation will always be the same. When this is touched to the necks of the various teeth, one after the other, if the stimulation causes pain for less than a second the pulp is probably normal; if the pain lasts for two or three seconds the pulp is irritated and perhaps slightly infected; but if the pain lasts over three seconds or increases until the whole side of the face is involved in a spasm of pain, the only cure is to remove the nerve or remove the tooth. Where there is no reaction at all in a tooth and normal reaction in other parts of the mouth, it indicates a probable reduction in the vitality of the pulp or its death. This should be investigated, and if found infected the pulp should be removed and the canals properly filled, but it must not be forgotten that some people normally have teeth that are sensitive to heat, and in other cases, in which there is a general lack of response, great caution and conservatism should be used.

The sure diagnostic sign is unusual response to stimulation of a tooth among its fellows, followed by severe and prolonged pain.

THE TREATMENT OF DIPHTHERIA.

The *Practitioner* for August, 1914, contains an article on this topic by MARTYN. He recalls the fact that it has been stated by some authorities, and it is believed by many medical men at the present time, that liberal doses of antitoxin are responsible for many of the bad after-effects or sequelæ of the disease, such as paralyses, neuritis, etc. This has not been the writer's experience; any temporary ill effects, such as rashes, joint-pains, etc., are not influenced by the size of the dose, for a small dose may act just as severely as a large.

Giving bicarbonate of soda in severe cases serves two purposes. In all bad cases of diphtheria, especially when the tonsils and fauces are involved, there seems to be a pronounced interference with fat metabolism in the liver, resulting in the appearance of diacetic acid and acetone, especially the latter, in the urine, which in consequence has a much enhanced acid value. At the same time there is a marked accumulation of fat in all the organs, particularly in the heart, liver, and kidneys. Ample proof of this has been found in every post-mortem examination conducted on bodies of children dying during the acute stages of the illness. To this change, which is progressive, the vomiting, the irregularity of the heart and its failure are probably due. The administration of bicarbonate of soda, subcutaneously, by mouth, or by rectum, has certainly proved of great benefit in many of these cases, and in nearly all it has reduced the vomiting considerably. Further,

it is grateful to the patient as a drink, and it helps to clean the tongue and throat.

Adrenalin chloride is not given to raise the blood-pressure, but to keep it from falling. It is therefore given in small doses of constant strength at regular intervals from the very beginning of a case, and its administration is persevered with until the circulatory system has recovered its tone. It is a grave error to give adrenalin chloride or any other substance with a like action toward the end of a case or in large doses at occasional times only. To do this is simply to add to the load to be overcome by an already failing heart, and to run the risk of bringing the whole machinery to a sudden stop.

ECLAMPSIA, WITH SPECIAL REFERENCE TO ITS TREATMENT.

In *Colorado Medicine* for August, 1914, FERRIS makes the following deductions:

(*a*) The underlying cause is primarily the pregnancy.

(*b*) The eclamptic attack is produced by some toxin, or toxins, circulating in the blood, due to deficient chemical changes in the production of urea, or other chemical changes, and abnormal protein metabolism, combined with insufficient elimination through kidneys, breasts, bowels, liver, skin, etc., all of which react upon the brain centers in such a manner as to produce the eclamptic outburst.

While scientific researches are being carried on by those in position to make them, yet it is an incumbent upon us all to keep watchful care of patients, and endeavor to ward off this complication of what should be a physiological condition.

The laity should be educated to the point where every pregnant woman would feel it her duty to immediately place herself under the care of a physician.

The important duty is:

(*a*) To detect danger-signals in pregnant women.

(*b*) To determine what to do from a prophylactic standpoint.

(*c*) When danger seems imminent, what measures to pursue first.

(*d*) How long to wait before more radical procedures are inaugurated.

The symptoms of suspicion are: Headache, constipation, pains in epigastrium, continued and unduly long nausea and vomiting, restlessness, dizziness, somnolence, disturbance of vision, etc. Albuminuria may or may not be present, as recent experiences have proven that convulsions may occur, even though examination of the urine immediately prior to the occurrence has shown absence of albumin and casts. One of the most important indices now at the writer's command is the condition of the blood-pressure. After careful experiments, covering a period of five years, Starling is convinced that during the whole period of normal pregnancy the blood-pressure is normal, and any rise above 125 mm. Hg. would make him suspect that the pregnancy was not quite normal, and would put him on the lookout for some degree of toxemia.

The prophylaxis consists in watchful care of pregnant patients.

At the first sign of any of the above symptoms, the patient should be required to keep absolute quiet of both body and mind in bed for at least a week or two, on milk diet, with large quantities of water, the bowels thoroughly cleansed, and the kidneys and skin kept active.

A survey of the many methods formerly used in treatment shows a quite constant empirical effort toward the same end, viz., a relief of high blood-pressure and elimination of the poisons.

The same object may sometimes be attained by very different means, and in those instances where the drugs used have apparently proven successful, they may have been so because the desired effect was obtained in conjunction with the reduction of the blood-pressure by hemorrhage consequent upon the removal of the fetus.

The drugs commonly used range from bowel, kidney, and skin stimulants, such as Rochelle and Epsom salts, potassium citrate and acetate, nitre and pilocarpine, up to those which are supposed to control the convulsive attacks proper, viz., chloral, morphine, veratrum, chloroform, etc.

But the fact remains that the underlying cause is always the presence of the fetus *in utero,* and this brings the writer to the question of the time and means of delivery.

If under the régime outlined the patient's condition is not favorable to a safe outcome, the question of the best means of terminating the pregnancy should be carefully considered. Nor should we wait until the apperance of convulsions, as the recent experience of Schmid and Gottschalk show that eclampsia undoubtedly does occur in some instances without the convulsions.

Before the viability of the fetus more time for consideration may be consumed, provided the mother's condition is not immediately dangerous.

The induction of premature labor should be accomplished by that means which will relieve the uterus of its burden in the least possible time, with the least possible irritation of the maternal nervous system.

In multiparæ usually the slow method of introduction of a catheter outside of the membrane will suffice to bring on labor, or rupture of the membranes followed by metreurysis may be done.

In primiparæ it is advisable to soften the cervix by packing with gauze for twenty-four hours or longer, and to follow this with the use of the hydraulic bags. In the more urgent cases, resort should be had to immediate anesthesia, with radical surgical procedures, either incisions of the cervix or vaginal Cæsarian section.

After viability, in patients who do not react favorably to a proper hygienic and dietetic régime, and whose urine shows a constant decrease of urea secretion, with tendency toward increase of albumin, and especially should there be other untoward symptoms, such as headaches, twitchings, or flashes before the eyes, experience seems to teach that the earlier the uterus is emptied the better the chances for both mother and child.

In multiparæ this may be accomplished by *(a)* rapid delivery if easy, *(b)* accouchement forcé under anesthesia, or *(c)* if necessary Cæsarian section.

In primiparæ the surest method for mother and child, at or near term, is Cæsarian section under ether. No morphine should be given, as the child's chances for resuscitation are greatly lessened by its use.

Convulsions occurring postpartum are quickly controlled by venesection, followed by saline infusion, and voluminous flushing of the bowels with warm salt solution.

SODIUM FLUORIDE FOR INSECTS.

MEANS, Passed Assistant Surgeon U. S. S. *Cincinnati,* states that at one time the storerooms and pantries became infested with roaches, and the ordinary insect powders seemed to have no effect on them. Sodium fluoride was then used with marked result. Not only were the roaches killed, but also the ordinary black-beetle that is found with the roaches.—*U. S. Naval Medical Bulletin,* July, 1914.

ADDRESS ON THE PRESENT POSITION OF CEREBRAL SURGERY.

THORBORN (*Medical Chronicle,* 1914, lix, 1; quoted by *Surgery, Gynecology and Obstetrics,* August, 1914; abstracted by Armstrong) attempts to arrive at some general conclusions as to the final results of surgical interference in epilepsy and cerebral tumor. In considering epilepsy it must be remembered that almost any operation may produce a temporary arrest of symptoms, and one must thus be certain that when a direct attack upon the probable focus of disease appears to have cured it, one is not misled by a mere lull in the symptoms. Cushing's figures on 58 cases are quoted, with 20.7 per cent of recoveries and 52 per cent improved. Rawlings refers to 20 cases, 10 per cent being cured and 70 per cent markedly improved.

The author's series consists of 19 cases which he has followed for at least two years. Of these, five are completely cured and six greatly improved; or in other words, over a quarter have been successfully operated. The author advises that operation be limited absolutely to traumatic cases with a definite cranial lesion or focal

symptoms, as he has never seen any benefit from operation for idiopathic epilepsy. Commonly, adhesions of the dura to the skull or of the cortex to the dura are found, sometimes bony spiculæ, an osteitis, or cysts. He has never had any trouble with the cranial defect and never had to use any artificial covering.

Four hundred and ninety cases of cerebral tumors are tabulated, and from these figures it may be assumed that operation was of little or no value or may have hastened the end in 37.9 per cent, while it has probably saved or greatly prolonged life in 23.6 per cent. In 38.3 per cent its value was doubtful. While a cure of less than 25 per cent is not very encouraging, it must be remembered that the great majority of cerebral tumors are malignant, and thus we are driven to the position that with our present resources cerebral surgery has to aim not so much at the cure of malignant disease as at the prolongation of life, the prevention of blindness and of intense headache. As in the case of epilepsy, mere exposure of the cerebral cortex is almost free from risk, whereas deep operations upon the brain substance become very fatal, the dangers of exploration being as great when the growth is not found. Early decompression is advised in every case of cerebral tumor, while anything else that may be done must be left to the opportunities of the moment in favorable cases.

WOUNDS OBSERVED IN FLANDERS.

Makins *(Lancet,* Nov. 21, 1914) in a paper describing his personal experience with the English forces in Flanders, after alluding to transport arrangements, states that with the change in the military situation and the character of the fighting the nature of the wounds to be dealt with has also undergone considerable alteration, the preponderance in the number of shell wounds having greatly decreased, and those inflicted by rifle bullets having risen to probably more than 50 per cent. The wounds are in the main of a very severe type. This appears to be dependent on the fact that they have nearly all been received at the short distance of about 200 yards which separates the opposing trenches, and that many bullets ricochet and acquire irregularity of flight by striking the margins of the trenches. The type of entry and exit wounds is somewhat varied from those produced by the older Mauser and Lee-Metford bullets. One especially striking form is that in which the central round wound has a slit passing from opposite sides, suggesting that the original opening has been enlarged with a knife for purposes of exploration. There are many stellate exit wounds. Gangrenous cellulitis at the time of the report, to wit, November 12, was common. It has been proved that this condition may develop as the result of a simple rifle-bullet wound, and when this is the case the absence of the safety vent afforded by the larger shell wounds may render the extension of the infection a still more rapid process. It is most rapidly fatal in wounds ill drained. Its advent is not heralded by serious general symptoms. The most striking features in the late stages are sleeplessness and the development of extreme anemia and a peculiar slackness in the tension of the pulse, the patients meanwhile taking their food well, smoking cigarettes, and making little complaint.

Locally the first signs are rapidly increasing edema; at first white, later large patches of bronzy redness of unequal depth of tint develop, while at the upper limit of the discolored area crepitation is palpable. The glands of the axilla or groin enlarge early, but they are hard, not very tender, and never reach a large size or suppurate. After two or three days the portion of the limb distal to the wound becomes cold, pulseless, and gangrenous. The distal gangrene is of arterial type. The limb in cases which survive long enough mummifies, and a very sharp line of demarcation develops.

No satisfactory method of treatment has yet been discovered. Multiple incisions made at the limit of advance of the process check it and bring it to a standstill, and some benefit has been claimed from the

method of injecting hydrogen peroxide in the same region, although Makins has seen little to support the opinion. When the affection is in the upper limb a considerable proportion of the cases survive; if it is in the lower limb they mostly die. When amputation is performed short flaps are made and the stumps are left completely open, as otherwise there is an extension of the gangrenous process. In this relation Wilson's report *(British Medical Journal,* Nov. 7, 1914) is interesting. He notes that aseptic surgery is a distinct failure. He also observes that bullet wounds become very septic, although the French surgeons apply strong tincture of iodine at once and hydrogen peroxide later. He states that shrapnel wounds do well as a rule, but must be rubbed up with iodine. He speaks also of the effects of air concussions, which act like heavy, solid blows, causing pain and soreness in the soft parts, the soldiers calling this pain rheumatism. A species of neurasthenia may result.

GERMAN EXPERIENCE OF BULLET WOUNDS.

KRASKE'S experience *(British Medical Journal,* Nov. 7, 1914) with the German wounded, dating back to the middle of August, is of interest from the standpoint that he is on the whole better satisfied with their treatment than he had anticipated would be the case. He states that the first-aid dressings were so efficient that contrary to expectation pain and inflammation did not usually supervene.

THE ULTIMATE RESULTS SECURED BY SURGICAL INTERVENTION FOR CHOLELITHIASIS.

CLARK *(American Journal of the Medical Sciences,* November, 1914) reiterates his views to the following effect:

The usual statement that 95 per cent of gall-stones produce no symptoms is fallacious, because it is based on autopsy and dissecting-room statistics.

Bile possesses no bactericidal properties, for in the majority of cases of cholelithiasis microörganisms of a more or less pathogenic nature are discovered. Under these circumstances many vague symptoms, usually termed gastrointestinal or general constitutional disturbances, may arise as the result of toxins elaborated about these foreign bodies in the gall-bladder.

All clinicians admit that a wide hiatus exists in the clinical symptoms between the early formation of gall-stones and the so-called classic attacks of biliary colic with jaundice. Abdominal surgeons should carefully record all gastrointestinal or hepatic symptoms, and any vague epigastric pains, and these should be associated with the findings secured on examination of the gall-bladder, with a view to establishing a further link in the symptomatology of cholelithiasis.

As cholelithotomy has been attended, in a large series of cases, with a mortality of less than 2 per cent, the removal of gall-stones during the performance of some other abdominal operation is not too hazardous an undertaking. Yet this coincident operation should be undertaken only as the result of most careful surgical judgment, for if the patient is in a critical condition from a prolonged operation, or if the primary operation has been done for a septic condition, this additional operative procedure may be attended by serious consequences.

From a study of the after-history of his cases he is convinced that cholecystectomy should be performed more frequently than is at present the case. Occasionally the gall-bladder is closed after the removal of uncomplicated gall-stones, but preference is given to the use of a simple drain.

Clark concludes that simple drainage is all that is necessary in cases of cholelithiasis in which there are no symptoms attributable to the presence of the stones. When the gall-bladder is thickened or greatly dilated, or if it be the seat of the so-called "strawberry change," as described by Moynihan, cholecystectomy should be the operation of choice.

He notes that many patients are referred to the gynecological wards for the repair

of lesions who exhibit clearly defined symptoms referable to the upper abdomen, and are considered by the family physician as reflex manifestations, although an accurately traced history would have left no doubt as to their true significance. Clark pronounces himself as a pessimist as regards the belief that reflex symptoms in the upper abdomen emanate from gynecological lesions. Attention is called to the fact that latent gall-stones frequently become active subsequent to parturition. This is due to the lessening of intra-abdominal pressure, with sagging of the gall-bladder and liver, thus causing a stagnation of bile, and precipitating an attack of cholecystitis. Moreover, a much larger percentage of stones occur in child-bearing women than in those who have never been pregnant. In gynecological cases gastroduodenal ulcers or gastric carcinomata have been found so infrequently as to be regarded as almost negligible. Therefore when the upper abdominal symptoms are vague and a possible disease of the pylorus, duodenum, and gall-bladder is considered, the ratio is greatly in favor of the gall-bladder as the seat of trouble. In Clark's cases the ratio was at least 100 to 1. In doubtful cases the diagnosis should invariably be cholelithiasis or cholecystitis, with the possibility of some one of these other lesions far in the background. In estimating the immediate and remote results of these combined operations, he has arranged his cases under three separate headings: First, simple gall-bladder cases—*i.e.*, those in which the surgical treatment was directed solely to the relief of the cholelithiasis; second, those cases in which some pelvic operation was performed and gall-stones were accidentally discovered; and third, gynecological cases in which there were unmistakable symptoms of associated gall-bladder disturbance.

So far as the immediate mortality is concerned, the first group, consisting of 55 cases, was attended by an immediate mortality of 4.3 per cent; the second by 7 per cent; and in the third no fatality occurred.

As would naturally be expected, the possibility of wound infection is proportionately greater when two or more operations are performed: first, because of the greater number of surgical incisions, which, of course, increase the risk; and secondly, the greater hazard, in changing from one operation to another, of possible defects in technique. To overcome these dangers, separate sets of instruments and rubber gloves should be employed in each new operation. So far as the instruments are concerned, there is nothing fraught with so much danger as the repeated use of the surgical needle. In a simple hysterectomy, for example, a needle used in closing the uterine stump should be discarded, for there is always danger of it becoming contaminated from passage through the cervical canal; if this has occurred it may, if used again, infect a fresh wound.

Notwithstanding these precautions, Clark's series of combined operations has shown a higher percentage of wound infections than the simple gall-bladder operations, in which the percentage of wound infections was 5.9; in the combined operations the rate was 9.7 per cent in one series and 9 per cent in the other. These figures cover any degree of wound infection from a small point to an extensive break in the wound. Another point to remember is that the greater the length of time consumed in these operations the more likely are untoward complications to arise during convalescence. Thus postoperative vomiting and phlebitis are observed in larger degree in the combined operations. Pneumonia occurred only once in the entire series of cases.

In cases of cholelithiasis unassociated with other abdominal or gynecological lesions 90 per cent of the results were traced, 69.5 per cent having been cured. No case returned for a second operation, and none had been operated on elsewhere. Of the 77 cases in class B, 78 per cent were traced; 59.7 per cent were cured, 17.5 per cent were greatly improved, 1.7 per cent were slightly improved, 8.7 per cent were unimproved, and 3.5 per cent had died of intercurrent diseases not connected with the biliary opera-

tion. Of the 31 cases in class C, 86 per cent were traced; 64 per cent were cured, 16 per cent were greatly improved, 4 per cent were slightly improved, and 8 per cent were worse than before operation. Special attention is called to the fact that in 13 of the cases in which there were unquestionable symptoms of the upper abdominal organs there were visible changes of the appendix. Thus the error in diagnosis falls chiefly between appendicitis and cholecystitis. In several of these cases the condition of the appendix gave rise to the acute symptoms which had precipitated the operation.

OBSERVATIONS OF INGUINAL LIPOMATA BASED ON 154 HERNIOTOMIES.

SPEED *(Surgery, Gynecology and Obstetrics,* September, 1914) has suggested that the inguinal lipomata found so often in connection with hernial sacs, or as the lone cause of inguinal bulgings, were of primary importance as a causative factor of hernia, and if not removed were a factor in recurrence.

If left behind, even in transplantation of the cord, regardless of the type of operation used to cure the hernia, they tend to cause a bulging of the inguinal canal; and as a part of the properitoneal fat, being attached to it, they are subject to some downward strain in increased abdominal tension from any cause, and exert traction on the peritoneal surface at or about the internal ring. This traction may cause the formation of a true hernia and give a recurrence following operation for radical cure.

The lipomata of the inguinal region divide themselves into two natural classes: those found in the direct type and those found in the indirect type of hernia. Those connected with the direct type are usually of broad base; they bulge up from the weakened area in the abdominal wall where the conjoint tendon is deficient, and may be closely adherent to or cover a large part of the circumference of the sac. When the sac of direct hernia is merely a bulging of the peritoneal wall on account of its lack of support by the muscles which should act as a retaining surface, the fatty mass may cover this in a uniform manner and depth or come out laterally in a separate mass. When separate, this fat adjunct of the protrusion in most cases takes its origin above the peritoneal bulging and may pass down over it and extend on down into the inguinal canal out of the external ring. Should this fat mass be dissected apart, a smaller and more distinct sac can be found and the removal of the lipomatous material favors a non-recurrence of the hernia. When direct sacs are small the writer is not in the habit of opening them at all nor attempting to ligate them off, but, by bringing down over them the curtain of the conjoint tendon and external oblique and attaching it to Poupart's ligament, he feels that sufficient repair has been done to cure the hernia. Removal of the excess fat with careful ligation of its blood supply lessens the amount of tissue that tends to bulge, and favors the cure. Ligation lessens the chance of hematoma formation, which might cause a pulling out of the deep stitches by pressure, or if unfortunately infected might cause abscess formation.

In indirect hernia the lipomata assume different shapes, dividing into:

Long pedunculated masses slightly lobulated and covered with a more or less true peritoneum-like covering which looks like a very thin sac, taking their blood supply from above.

Broad, bulging masses originating behind the cord at the internal ring and bulging out in the general direction of the cord, lying posterior to it; or,

Distinct fatty masses incorporated in the tissues of the cord with an attenuated neck at the internal ring.

These appear to take origin from the properitoneal fat, as their blood supply and continuity extend from this tissue and in some cases seem to have followed down in the wake of the sac, or in others seem to have preceded the true hernial sac and to have broken a way for it. In most cases they are found to originate from the lower aspect of the internal ring, are much longer

than the sac, and seek a pathway downward in the direction of the cord or round ligament, forming a more or less distinct pedunculated mass along the cord adherent to or separated from it, bulging out the inguinal canal and seeming to act as a space-forming wedge behind which the true hernial protrusion may follow. These may pass down to and out of the external ring.

Hernial protrusions are found clinically which on examination give the distinct bulging and coughing impulse, and one feels sure that there is a distinct sac to be found; yet on opening the canal nothing more than a bulging mass of fat can be found occupying the external ring. These masses may conceal behind them a small sac, and hence should be carefully pulled apart or followed up inside the internal ring and the presence or absence of sac determined before they are ligated and cut off.

Observation develops that most of these lipomata originate at the inner and posterior margin of the internal ring; they may, however, be found springing from the anterior surface and lying in front of the cord, and in some instances have been found in double and triple form, each lipoma taking a separate point of origin. Each mass can be separately stripped out and ligated. Naturally, fat individuals are more apt to have these lipomata than thin individuals, as they have a greater amount of properitoneal fat, but the lipomata are also found with great frequency in those of normal or even a subnormal amount of adipose tissue.

In herniotomy perhaps too little attention is paid to freeing the sac neck around the internal ring for a distance of one to two cm. after it has been freed from the cord tissues. The sac should be held up taut and the index-finger, gauze-covered, should sweep well around the internal ring, freeing the sac neck which the constant pull stretches further out into the wound. If ligated as in the ordinary run of cases, the ligature should always be deeper down—*i.e.*, nearer the abdomen—than the white line of the old thickened constriction ring which is present in practically every sac. In making this freeing dissection around the sac neck and pulling it down, one often brings into view hidden lipomatous masses, possibly of very broad base, lobulated, and as a rule pointed out from the internal ring and the general direction of the cord. These can be included in the ligature and removed even if the sac neck has to be further dissected up to get to their bases. The amount of time involved is small and the peritoneal surface is sufficiently elastic to allow much stretching. If they remain, or if the sac has been tied off too long with a tendency for the peritoneal surface to bulge out from the internal ring instead of being well retracted back and offering no depression into which omentum or other abdominal content may tend to wedge, these masses of fat become larger, are inclined to slip or wedge into this small extrusion, and cause gradual recurrence of the cured hernia.

Of 154 herniotomies performed, lipomata were found present in the opened canal 73 times, giving a percentage of 47.4.

OBSERVATION ON THE GONOCOCCUS COMPLEMENT FIXATION TEST EMPLOYING SPECIFIC AND NON-SPECIFIC ANTIGENS.

As the result of clinical and laboratory work Ivy and Birdsall *(Surgery, Gynecology and Obstetrics,* September, 1914) report as follows:

Very rarely have polyvalent antigens prepared from meningococci, pneumococci, streptococci, staphylococci, colon bacilli, or cornybacteria sufficed to fix complement. This does not jeopardize the specificity of the gonococcus antigen, since it is explained on the basis of supervention of a mixed infection.

In ten per cent of sera examined a weakly positive result was obtained with polyvalent micrococcus catarrhalis antigen; in these cases the reaction was much more marked with the various gonococcic antigens. Thus it may be inferred that the association between the gonococcus and the micrococcus catarrhalis is not positively and absolutely defined; and it is not unlikely, on

the one hand, that a culture of the M. catarrhalis is occasionally included in a supposedly specific polyvalent gonococcus antigen, while on the other hand it is undoubtedly true that a mixed infection, often due to the M. catarrhalis, exists in patients suffering from gonorrhea and its complications.

A negative gonococcus fixation test does not necessarily mean that the patient is not infected with the gonococcus; in a primary uncomplicated acute case they have never observed a positive reaction prior to the sixth week, nor have they obtained positive reactions where the anterior urethra or vagina alone was involved.

A positive result apparently is more specific than the Wassermann reaction, since thus far there is no disease other than gonorrheal in which a positive result was obtained.

A positive reaction has been discovered in 21 per cent of patients supposedly clinically cured; such patients, therefore, should not be discharged from treatment or observation until a negative response is obtained, provided the patient has not been the recipient of immunotherapy.

Thirty-three to seventy-five per cent of patients with chronic posterior urethritis, prostatitis, and seminal vesiculitis, with recurrent exacerbations, demonstrate a positive reaction.

Sixty-six per cent of all stricture cases have shown a positive result.

Approximately one hundred per cent of cases of active epididymitis or arthritis, at least by the fifth week, have demonstrated a positive gonococcus complement fixation reaction.

The test has proved of value in gynecology in the differential diagnosis of various pelvic inflammatory diseases from one another and from neoplastic formations; also in the differentiation of certain acute and chronic arthritides.

Sociologically, the gonococcus complement fixation test seems destined, along with the Wassermann, to play an important rôle in the future in determining the matrimonial fitness of candidates.

GUN DEAFNESS AND ITS PREVENTION.

Under this interesting heading HORNE *(Lancet,* Aug. 15, 1914) points out that in modern naval warfare injuries to the function of hearing result in irremediable deafness. The injuries to the drum and the nerve endings are due to sudden condensation or rarefaction of the air in the external auditory meatus. One ear is generally the more affected. Horne states that among sportsmen the left ear is as a rule affected, and that in one hunter whose right ear was involved it was discovered he shot from his left shoulder. Gun deafness is in a great measure preventable. The mouth should be kept open so as to equalize the atmospheric pressure. The author states that naval officers often chew toothpicks whilst the big guns are being fired, finding this accomplishes the same end. Aural plugs are strongly commended. The finger is objected to on the ground that it is not aseptic. Plugging with cotton-wool as practiced by Surgeon-General Suzuki was not found efficient. The material suggested by the author for plugging the ear is jewelers' wax.

SLIDING HERNIA.

ROCKEY *(Northwest Medicine,* October, 1914) implies by this term a hernia in which the viscus is incompletely covered by peritoneum and lies in part outside the sac. Diagnosis is usually made at the operation, although it may be surmised previously because of the difficulty of complete reduction. The rings are usually large, and without operation these hernias slowly increase in size and painfulness. They do not seem especially prone to strangulation. The proportion of the circumference of the gut that is uncovered by peritoneum may vary. The strangulation of the uncovered portion of the sliding hernia often endangers the blood supply of the gut. If the sliding intestine be freed, the sac can be so cut as to furnish a piece or pieces of peritoneum which can be turned over and stitched in place to make an artificial mesentery, and then the gut can be returned to the abdom-

inal cavity. This is the operation of choice and is applicable to the cecum and ascending colon, to the ileac and pelvic colon, and to the bladder. The remainder of the sac in such cases can be sutured up after the method of Kocher.

THE THYMUS GLAND.

GARROD (*British Medical Journal,* Oct. 3, 1914) states that it is now generally conceded that the thymus is a gland of internal secretion, despite the resemblance in its structure to that of the lymphatic organs, and its enlargement in association with these in the victims of status lymphaticus. But the methods which have thrown so much light upon the functions of the thyroid have, in the case of the thymus, yielded far less definite results.

The more recent experiments upon removal of the thymus in young animals carried out by Basch, Klose and Vogt, and Matti have yielded results sufficiently uniform to carry conviction. This is doubtless due to improvements in technique, which allow of more complete removal, and to the early age at which the operation was performed, for it must be remembered that in dogs and rodents the period of childhood, the interval between birth and puberty, is far shorter than in man.

In puppies experimented upon a period of latency of several weeks was followed by a stage of adiposity, and later by cachexia and wasting, and eventually by death in coma. Growth was arrested and the animals developed a cretinoid condition. But the most striking and characteristic effect of thymectomy is the supervention of changes in the bones so like those of human rickets as to be practically indistinguishable therefrom. Lastly, changes occur in other glands of internal secretion, such as increase of the adrenal medulla and enlargement of the thyroid, pancreas, and testes.

Of recent years the operation of thymectomy has been repeatedly performed upon children for the relief of dyspnea, but although the mortality has been high, the effects observed in animals have not been seen. In a single case, recorded by König, severe rickets followed the operation, which was, however, limited to removal of the left lobe of the thymus. Complete thymectomy, followed by recovery, has been recorded in children of six and nine months, but it is unlikely that the removal was so complete as in the animal experiments.

Of the converse effects of overactivity, or perverted activity, of the thymus we know almost nothing. Svehla's observation of a depressor action of thymus extracts loses all importance from the fact that such depressor action is common to extracts of most animal organs and tissues. Attempts to counteract the effects of thymectomy in animals by thymus feeding have seemed only to aggravate the symptoms, but reference may be made to some suggestive experiments by E. E. Hewer upon the effect of thymus feeding upon the activity of the reproductive organs in rats.

Tumors of the thymus produce pressure symptoms but no characteristic signs, and other gross diseases of the gland, such as syphilitic and tuberculous lesions, are equally devoid of clinical interest.

The subject is usually discussed under three heads—namely, thymic death, the sudden death of infants apparently healthy, apart from any antecedent signs of pressure upon the trachea; secondly, thymic asthma, a condition which may assume a more or less chronic form, or may manifest itself in paroxysms of stridulous dyspnea; and thirdly, the condition known as status thymicolymphaticus or status lymphaticus.

It is undoubtedly a fact that many infants who die suddenly possess unduly large thymus glands, but it is difficult to assert with confidence that the gland is of abnormal size, save in cases in which its size is such that no doubt is possible.

The limits of normality are somewhat wide, and very competent observers have arrived at estimates of the average weight of the thymus in a child of some two years which differ as widely as from 9 to 10 grammes to 25 to 30 grammes. Moreover, when the question of pressure is under con-

sideration it is obvious that the form of the gland, whether it be of the flat or plump variety, has to be taken into account.

Those who have seen thymus deaths of infants describe a sudden throwing back of the head, a gasping breath, rolling up of the eyes, dilatation of the pupils, and pallor or cyanosis. Other symptoms are swelling of the tongue, clenching of the hands, and extension of the legs.

Caution is needed in making the diagnosis of thymic asthma, and in some cases such a diagnosis made during life is shown to be incorrect post mortem. What is thought to be an enlarged thymus may prove to be an abscess around mediastinal glands, as in a case which Thursfield has described. Nor must it be forgotten that stridulous dyspnea in infants has several causes, such as enlargement of bronchial or tracheal glands, retropharyngeal abscess, membranous laryngitis, laryngeal spasm, and abnormality of the larynx causing congenital stridor. Lastly, there is evidence that not a few cases of supposed thymic death have actually been due to suffocative bronchopneumonia.

Around the question whether thymic asthma and thymic death in infants are due to pressure of the enlarged gland upon the trachea, blood-vessels or nerves, there has centered no little controversy.

Undoubtedly, the upper thoracic orifice of an infant is very small, and we may readily suppose that a large thymus may exert considerable pressure upon the surrounding structures. Tumors of the gland undoubtedly exert such pressure. On the other hand, the beneficial effects of removal of the thymus in some cases of thymic asthma are not so conclusive as they appear at first sight, for they may be equally well explained upon a theory of hypersecretion.

It is difficult to doubt that, in some cases at least, thymic asthma is due to pressure, but in others the stridor appears to be due to laryngeal spasm rather than to narrowing of the trachea.

Nowadays the name "status lymphaticus" is widely used—to the medical man a name of dread, to the layman a term of mystery. Hardly a week passes in which it is not heard in coroner's courts, in connection with deaths under anesthetics, or after slight injuries or shocks.

It is not necessary to dwell here upon the details of the classical description: the pale, pasty skin—no constant feature, by the way—the hyperplasia of the lymphatic structures of nasopharynx and alimentary canal, the somewhat enlarged spleen and thymus gland. Later observers have added fresh items to the list, some of which are of great importance, but the fundamental features remain unchanged.

The liability of so many young people to sudden death from slight causes is obviously a matter of urgent practical importance, and few problems can make a stronger appeal to the clinical worker than that of the diagnosis of status lymphaticus with reasonable certainty, during life.

It is obvious that not a few of the factors which go to make up the clinical picture are such as cannot be detected in the living patient. Such are the general enlargement of the intestinal follicles, the unduly small aorta, and the diminution of the chromatin tissue, which may be the most important of all. Of the accessible signs, special stress may be laid upon the hyperplasia of the lymphatic tissues at the root of the tongue, which may be seen with the laryngoscope, and which is regarded by good observers as especially characteristic. Enlargement of the tonsils and adenoid vegetations are so common apart from status lymphaticus as to have little diagnostic value, and the same is true of slight enlargement of lymphatic glands in the neck, axilla, and groins. But these conditions may help to strengthen a diagnosis based upon other signs. An increase of lymphocytes in the blood is of similar service, and if it can be shown that the thymus is abnormally large this affords evidence of considerable value.

The detection of thymic hyperplasia is no easy matter, especially in its minor degrees. Only when greatly enlarged will the gland present as a palpable tumor above

the manubrium sterni. Percussion may reveal a much more extensive dulness than the normal triangle, of which the base connects the sternoclavicular joints, and of which the apex reaches downward to the level of the third costal cartilage. Probably the most valuable indicator of hyperplasia is the thymic shadow thrown by the *x*-rays, which rests upon the shadow of the heart. Mr. R. E. Humphrey regards as an additional sign, valuable in diagnosis, a lowering of the upper limit of the superficial cardiac dulness, in the absence of emphysema or other changes in the lungs which may account for it.

Wiesel, who first observed the reduction of chromatin tissue in status lymphaticus, inclines to the view that a sudden fall of blood-pressure due to adrenalin defect is the fatal condition. In cases with marked hyperplasia of the thymus, but no other signs, the loss of substance of the adrenal medulla is not observed, and Wiesel suggests that subdivision is needed into cases of status thymicus, thymolymphaticus, and lymphaticus. He has also shown that status lymphaticus is usually present in Addison's disease, and not only in the primary, non-tuberculous cases. It may be that the condition of the adrenal medulla renders it an easy prey to the tubercle bacillus.

In exophthalmic goitre, too, status lymphaticus appears to play a part. That the thymus is often large is well known, and an associated lymphatic state may explain the sudden deaths of patients with Graves's disease during and apart from the administration of anesthetics.

The treatment of diseases of the thymus has hitherto been almost entirely directed to the relief of pressure caused by the enlarged gland. That the size of the thymus can be readily reduced by irradiation appears to be beyond doubt, and caution has been enjoined in exposing the thorax of a young infant to the *x*-rays on this account. It is difficult to suppose that any treatment can be of avail for status lymphaticus as such, but if the fatalities which it entails are due to failure of internal secretion we may hope to do something to reduce its fatalities by the administration of adrenalin, pituitrin, or the active principles of other secretions.

Supplementing this paper is one by MacLennan reporting eight cases of thymectomy and referring to his experimental work, published in the *Glasgow Medical Journal* for August, 1908. Among other conclusions he arrived at the following: The gland is not essential to life or health. The function of the gland is temporary. The association between it and the thyroid is close, each tending to atrophy on the removal of the other. In certain cases of exophthalmic goitre it has been advised that the thymus should be removed before the thyroid. The action of the enlarged thymus is not mechanical but physiological.

In his operation perfected by animal experimentation, he employed chloroform. The steps for the removal of the gland normal in size or slightly enlarged are the following:

A short incision is made through the skin and subcutaneous tissue of the suprasternal fossa after the skin has been drawn downward over the sternum; the incision should extend about one inch, and have its lower end placed just over the upper part of the sternum.

The deep fascia, the sternohyoids, and the sternothyroids are raked apart by a pair of blunt, double-hooked retractors.

The cervical horns of the thymus will then appear under the sternothyroids. The loose capsule of the gland should be cleared from that part of the gland exposed. The left lobe should be picked up with dissecting forceps (sharp-pointed should not be used) and drawn out from beneath the sternum; a second pair of forceps grips the gland lower down as it becomes exposed, and by a hand-over-hand movement the left lobe is withdrawn from the capsule. It is occasionally necessary to free the capsule by a blunt-pointed instrument.

The right lobe is removed by the same maneuver. It is the author's experience that when the lobe is removed first there is more likelihood of the gland being got out entire.

The left pleura may be opened during the removal of the corresponding lobe, but the puncture of one cavity does not interfere unduly with the respiration.

Hemorrhage should not be troublesome, and indeed it is seldom that any vessel requires ligation. Any large vessels appearing during the extraction of the gland should be ligatured at once while on the stretch and should not be allowed to retract within the thorax.

The operation is therefore an intracapsular enucleation.

Immediately the extirpation is completed the deep structures are sutured with fine catgut; before the last suture is tied the thorax should be compressed so as to expel as much air from the pleura or mediastinum as possible.

The skin is united by a few silkworm sutures.

A small pad of sterile gauze is then sealed in by rubber adhesive plaster.

In some the glands are either too large or too adherent to be removed by this method. These may require removal of part of the sternum, and incomplete extirpation is regarded as an unwise practice. The first case operated on was sixteen months old. It was brought to the dispensary because of crowing respiration. The thymus was removed entire. There was trouble during the operation, which called for artificial respiration, inflation of the lungs, etc. The child is now seven and a half years old and in perfect health.

The second case, six years old, was regarded as a case of achondroplasia. The thymus was removed entirely in March, 1908. The microscope showed no abnormality. The operation was without effect. The child was followed for some years. The legs remained short and the arms long. The bones are curved and expanded at their ends.

The third case was ten months old, suffering from cyanosis and fits. The diagnosis was status lymphaticus. The thymus was removed entire and showed a normal histology. The fits continued as before. The child died during a seizure a week later. The wound remained clean.

The fourth case was one month old. The maternal diagnosis was "kinks," the medical one of laryngismus stridulus. On operation the left lobe could not be found. Part of the right lobe was taken out. Five days later the child had what was called a temper fit and died of it. The portion of the thymus not taken out was found adherent to the innominate vein. It was very rigid and turgid. The thyroid was normal.

The fifth case was seven months old. It was also brought to the dispensary on account of having "kinks;" 23½ grains of the thymus was taken out from the left lobe, which was all that could be induced to come from the thorax. Microscopic examination demonstrated normal structure. After temporary diminution of the fits they increased in severity. The child died in about six weeks following operation. The remaining thymus weighed 218 grains and extended over both pleuræ, being somewhat adherent to the great vessels. The thyroid was normal. The head of the pancreas was hard and tense and the adenoid tissue was increased about the glottis.

The sixth case was fifteen months old and was brought to the dispensary on account of crowing respiration. During an attack he became almost unconscious; cyanosis was not present, but the child became rather white about the lips. About twenty to forty fits occurred daily; he was never a day without one. Ninety grains of a very firm thymus were removed. Ten days later the fits were reported more numerous and severe. Later tetany developed and the child died.

Two other cases are reported, but without ultimate results. Mention is made of a twelve-month infant brought to the dispensary because of spasm of the windpipe since birth. Following measles and whooping-cough six months later the spasms ceased. When three years of age the child died with symptoms of tuberculous meningitis.

Another similar case was examined with the intratracheal speculum; the trachea was neither stenosed nor flattened. The patient died the next day in a "kink."

The author holds that these cases demon-

strate the better results of a complete removal, and the impossibility of this without at times a risky operation. No case died on account of the operation.

All these cases were subjected to surgical treatment in 1908-'09. The author states that he has seen many cases suggesting thymic origin, but that in none has he deemed it needful to operate, nor does a perusal of this brief summary of personal experience lead one to believe that his final decision is unwise. There seems to have been but one case in which any benefit could be traced to the operative procedure.

SURGERY OF THE SPLEEN.

FINKELSTEIN (*British Journal of Surgery,* Vol. II, No. 5) concludes an interesting review of this subject with a tabulation of many cases as follows:

Operative treatment gives good results in stab and gunshot wounds, and ruptures of the spleen.

Very satisfactory results are also obtained by operating on echinococcus and non-parasitic cysts.

Splenectomy, in malignant tumors, gives temporary relief; but most patients succumb eventually from recurrence.

Operation gives excellent results in wandering spleen.

Splenectomy frequently ends in full recovery in protracted malarial fever, even in cases of ascites.

PRIMARY HYPERTROPHY OF THE GUMS AND REDUPLICATION OF THE LIP.

GREIG (*Edinburgh Medical Journal,* October, 1914) notes that the condition is bilateral, exhibits no tenderness or inclination to bleed, and is congenital, but may not manifest itself until the eruption of the teeth. Treatment is perfectly simple and efficacious. Under a general anesthetic the knife is drawn firmly along the gum at its proper level, and the strips so marked off readily removed, first in the lower jaw, then in the upper. The wounds heal kindly and there is no recurrence. There was no necessity in any case to remove the tissue from the buccal aspect, but only from the labial aspect of the jaws. Related to this condition, of interest to both general and dental surgeons, is a curious state of reduplication of the upper lip, not at all uncommon in a minor degree, but seldom so distinctly marked as to call for surgical interference. When exaggerated it may call for surgery because of the deformity. It is always observed in the upper lip and consists of a reduplication of the mucous portion. This reduplication may be as large as the lip itself. It is evidenced during talk and particularly during smiling or singing. The ultimate results of plastic surgery are extremely satisfactory. There is not the least difficulty about the excising of the redundancy, but the part to be excised must be marked off with a knife while the lip is at rest, for the limits and extent of the deformity are obscured the moment the lip is drawn into an abnormal position. A general anesthetic is indicated.

SYPHILIS OF THE VERTEBRAL COLUMN.

J. RAMSAY (*American Journal of the Medical Sciences,* August, 1914) concludes an excellent article on this subject as follows:

Syphilitic spondylitis and perispondylitis while rare are nevertheless sufficiently frequent to be given careful consideration in every case of acute or chronic vertebral disease. The onset may be sudden, simulating an acute rheumatic affection, or it may develop gradually and run an exceedingly chronic and protracted course.

Localization in the cervical region, especially, should awaken the suspicion of lues, as more than half of the recorded cases are of this region. It may, however, occur in any portion of the spinal column.

Of 100 cases available for analysis, Hunt found that 25 per cent were associated with some complication referable to the nervous system. These were either of the nerve roots and plexus or of the spinal cord itself.

Generally speaking, in this group of cases with neural complications, the symptoms

indicated a lesion of the spinal cord in two-thirds; in the remaining third the neural symptoms were limited to an involvement of the nerve roots or plexus.

FIBROCYSTIC DISEASE OF THE BONES.

ELMSLIE (*British Journal of Surgery*, Vol. II, No. 5) classes under this heading the affection variously characterized as bone cyst, osteitis fibrosa, etc., giant-cell sarcoma, and enchondroma. It is well known that cysts occur in many of the long bones, as well as more rarely in the skull and small bones. They may be single or multiple. They may be simple or surrounded by an area of diseased bone, the latter often showing the conditions usually described as osteitis fibrosa. They may occur in other conditions, such as Paget's disease, osteomalacia, and osteoarthritis. They may also result from the degeneration of cartilage tumors and of giant-celled sarcomata. In addition, they may result from the breaking down of true sarcomata; and they have been recorded by Frangenheim in callus at the seat of a fracture. An investigation of bone cysts is therefore a very complicated undertaking, involving a review of a large part of the pathology of morbid conditions in the bones.

As to the humerus, cysts in the upper part of this bone are probably more common than any other endosteal tumor. Secondary carcinoma may occur here, and give rise to difficulty in older subjects, more particularly if the primary tumor is not in an accessible situation. True endosteal sarcoma of the upper end of the humerus is usually a very painful affection; the radiograph will, at quite an early stage, show that the tumor has expanded beyond the limits of the bone. Chronic abscess and gumma of the humerus are also rare; they should be distinguished by the presence of periosteal thickening of the bone.

The proper treatment of these cysts of the humerus is curetting, which should be thorough, the medullary cavity being opened above and below so as to admit normal marrow to the cavity left. The contents of these humerus cysts are fluid, varying from yellow to deep reddish-brown; sometimes clear, sometimes containing cholesterin crystals, which are probably the result of previous hemorrhages. In several cases this fluid has been cultivated; upon one occasion only has any growth resulted, and then only a white staphylococcus.

Very few cysts have been recorded in the clavicle, and they were mostly myelomata. They are still rarer in the radius. In the femur a large number have been recorded. There is often a large solid tumor. Fracture is very common and may be incomplete. Union of fractures is as a rule good. As to the diagnosis of sarcoma this may be extremely difficult. The central position of the tumor, the persistence of a layer of cortex, and the absence of periosteal changes will all suggest a cyst.

Cyst of the tibia exhibits several distinct types. The tumors occurring in young people often follow trauma. Pain and swelling are often prominent symptoms, and curetting results in cure. They are usually lined with fibroid tissue, with patches of cartilage, and from their contents growth cannot be obtained. Most of the cysts described in the fibula have been definitely myeloid sarcomata. There are several recorded cases of cysts of the skull associated with surrounding osteitis fibrosa. Cases in which cystic tumors or fibrocystic disease of more than one bone have occurred are numerous, and apparently belong to more than one group. The various types may be summarized as follows:

Simple single cyst, with perhaps some tissue of a composite nature in the walls, but with no evidence that they have arisen from myelomata. They occur in the upper end of the humerus, in the neck of the femur in young children, in the lower end of the femur, and occasionally in other bones.

Cysts definitely resulting from alteration in myelomata. They occur in the clavicle, radius, lower end of the femur, tibia, and fibula.

Cysts intermediate between these, in

which scraps of myeloid tissue have been found in what was apparently an innocent cyst, with walls of composite tissue. They occur in the humerus, lower end of the femur, tibia, and fibula.

Cysts embedded in masses of composite tissue, usually described as fibrous osteitis. They occur chiefly in the femur, tibia, and skull.

"Fibrous osteitis" without cysts. It occurs in the tibia.

Multiple cysts.

Multiple lesions; some cysts, some solid tissue containing cysts, some solid tissue without cysts.

Myeloid sarcomata and cysts, in a diffuse disease of the bones which has caused softening and fracture.

REVIEWS.

A Text-book for Midwives. By John S. Fairbairn, M.A., B.M., B.Ch., F.R.C.P., F.R.C.S. Oxford University Press, New York, London, 1914. Price $3.75.

The author begins the preface of his book with an apology for adding another to the many text-books from which the midwife can make her choice. He has two excuses: First, that he believes his text-book has characteristics of its own, and, second, that the material in its pages represents an experience of the needs and aspirations of midwives acquired by over twelve years of association with them as teacher, examiner, postgraduate lecturer, and medical colleague. It is evident that the book has a wider sphere of usefulness in England than in this country, since midwives in England, while, perhaps, not more numerous than they are in America, probably have a better clientele, at least to some degree, and certainly are of a higher type, than the average American midwife, most of whom we feel sure would be benefited if they could peruse the pages of this volume with sufficient intelligence to grasp its contents. Fairbairn found that the first difficulty in teaching people of this type is their want of knowledge of the elementary principles of physiology. For this reason he has introduced sections which are designed to give the midwife physiological facts which are closely associated with the theme upon which he writes. He has endeavored to make the pupil reason for herself, and has added a glossary of medical terms so that when the beginner meets with a word that she does not understand she can readily obtain its definition. Care has also been taken to provide the book with an exhaustive index. The type is large and easily read. The language used is simple. One chapter is devoted to the rules of the "Central Midwives' Board," a board which is not represented by any similar administrative body in this country, unless it be approximated by some of the Boards of Health in the larger cities. There can be no question but that this book will do a large amount of good in England, and we hope that it may do much good on this side of the water also, although we do not believe that the average midwife can be persuaded to purchase it excepting under the rules of a Board of Health, which has the power to insist upon her taking a certain amount of instruction before she is considered fit for the practice of her art.

Reducing Weight Comfortably. By Professor Gustav Gaertner. J. B. Lippincott Company, Philadelphia, 1914.

This is a volume which doubtless will interest many physicians, and many patients if it is placed in their hands. Like a large number of other contributions by our German colleagues, it is written evidently not only to disseminate the views held by Dr. Gaertner, but also with the hope that it may bring patients to his doors. The preface begins with these pregnant words: "On the day on which I write these lines I have commenced my two thousandth treatment. I have satisfactorily completed sixteen or seventeen hundred treatments, or, in other words, I have in each case dismissed my

patient at the end of the treatment, having effected the reduction in weight which, at the beginning of the treatment, I pronounced desirable." He adds that almost invariably the treatment is carried out at home.

There are some twenty-six chapters in the book, and curiously enough an appendix in which he gives advice as to a "fattening treatment." He describes the methods to be pursued as to exercise, the diets which he orders, and closes, again with these pregnant words: "I take the position of those who assume that there are many who consume more nourishment than they should." It is evident that Dr. Gaertner is an enthusiast. Without enthusiasts the world would be a dreary place; nevertheless, enthusiasm must be tempered by judgment. We believe that Dr. Gaertner's methods are capable of producing much good in some cases. If his successes amount to ninety per cent this would lead us to believe that possibly he picks his cases for his statistics, or is satisfied with results which others would consider unsatisfactory. Nevertheless there is much that is useful and encouraging in the text which Gaertner has prepared.

THE HEART IN EARLY LIFE. By G. A. Sutherland, M.D., F.R.C.P. The Oxford University Press, New York, 1914. Price $2.00.

The author says in his preface that when he goes back to his student days and tries to remember the teaching on the subject of the heart in early life, his recollection is that it was a subject almost entirely ignored, both in lectures and in text-books. This book is, therefore, an attempt to enable the young practitioner to fill up some of the blanks which may have been left after his medical course is finished. A special effort is made to explain problems which otherwise are difficult. He wisely pays tribute to Mackenzie for the additions which he has made to the science of cardiology. The book is freely illustrated and deals first with the Interpretation of Polygraphic Tracings. Section one deals with Cardiac Disturbances of a Functional Nature; section two considers Disturbances which are on the Border-land between Functional Disturbances and Organic Disease of the Heart; and section three deals with Organic Heart Disease in All its Forms, taking up, as may be well imagined, two-thirds of the volume. While in one sense the cardiac disorders of childhood closely resemble those met with in adult life, nevertheless there are certain distinctions or differences which those who have large experience will recognize, and Dr. Sutherland's book is one which the general practitioner and particularly the pediatrist may read with much advantage.

CHILD TRAINING AS AN EXACT SCIENCE. By George W. Jacoby, M.D. Funk & Wagnalls Co., New York, 1914. Price $1.50, by mail $1.62.

It is not often that one who is so favorably known, and so widely recognized as an authority by the medical profession, is persuaded to write a book which deals with a semi-medical or popular topic. Dr. Jacoby, as a member of the American Neurological Association and a physician of wide experience, is peculiarly qualified to prepare the text of a volume bearing this title—the more so as he is noteworthy among neurologists for his well-balanced judgment concerning neurological matters and facts connected with the development of the mind and nervous system in both children and adults. After some introductory matter he deals with the Psychology of Childhood, the Psychic Abnormalities of Childhood, Prophylactic Training to Prevent Overdevelopment, and Therapeutic Training to Improve the Mind and Nervous System. He is careful in what he says to give advice to the parents of children in a manner which cannot be misunderstood or twisted about in such a way as to lead them to wrong deductions and methods, as is so often the case when medical men write for the laity. At the same time it is to be recalled by our readers that this book is not one which can be placed in the hands of the lower or middle classes with much expectation that it will be read, or, if read, will be intelligently followed, as it is distinctly a volume which is to be digested by the well-educated mind.

A Text-book on Diseases of the Nose and Throat. By D. Braden Kyle, A.M., M.D. Illustrated. Fifth Edition, Thoroughly Revised and Enlarged. W. B. Saunders Company, 1914. Price $4.50.

When the first edition of Dr. Kyle's book upon "Diseases of the Nose and Throat" appeared in 1899 it was received with marked evidences of approval on the part of the medical press, general practitioners, and by those members of the profession who limit their practice to the treatment of diseases of these parts of the body. The subsequent editions of the book have maintained the high level set by the first edition, and have increased the popularity of the volume. It may be fairly stated that the fifth edition represents rhinology and laryngology as they exist to-day in a complete and adequate manner.

Having had large experience in laboratory technique and in microscopic diagnosis in the early part of his medical career, Dr. Kyle has happily combined the knowledge of the pathologist with the knowledge of the clinician, and is, therefore, able to set before us clearly both the underlying processes of disease and the methods which should be taken for their correction. The general practitioner will find in the volume many therapeutic hints which he can carry out with success without instruments or training in their methods of employment. It is, too, somewhat unusual to find one who, having had large experience in the examination of morbid tissues, nevertheless is so optimistic as to what can be done in improving the state of these tissues while vital processes still exist in them.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D. Assisted by L. F. Appleman, M.D. Volume IV, December, 1914. Lea & Febiger, Philadelphia, 1914.

The December issue of Progressive Medicine, which has now finished its sixteenth year of publication, is devoted, as in previous years, to a consideration of Diseases of the Digestive Tract and Allied Organs, the Liver, Pancreas and Peritoneum, by Edward H. Goodman, M.D., Philadelphia; Diseases of the Kidneys, by J. Rose Bradford, M.D., F.R.S., London; Genito-Urinary Diseases, by C. W. Bonney, M.D., Philadelphia; Surgery of the Extremities, Shock, Anesthesia, Infections, Fractures and Dislocations and Tumors, by Joseph C. Bloodgood, M.D., Baltimore. This volume also contains a Therapeutic Referendum, covering more than 100 pages, reviewing the therapeutics of the last twelve months, by H. R. M. Landis, M.D., Philadelphia.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

This month, as in the two or three preceding months, there is no medical news as regards societies, etc., to chronicle. Early in November there was a great rush of wounded from the front, which was increased by the fact that the Belgian wounded were also, as far as possible, being treated in this country. The military and territorial hospitals were overcrowded, and patients had to be sent on to many other institutions where room could be found. Apparently the most severely wounded are retained in Boulogne, and the cases which come to this country are divided into two classes, the first class being "stretcher cases," which are lying down and generally involve some wound of the thorax, abdomen, or legs, and a second class in which the wounds are either quite superficial or slight in these parts, or wounds of the upper extremity and face. Nearly all the wounds are septic, but the sepsis appears to be, in most cases, very mild in character, and with the usual surgical treatment they get well rapidly. Amongst the convoy were a number who had no outward wound but were suffering from various complaints, such as

traumatic neurasthenia and some injuries which had not caused either contusion or laceration.

Some of the cases of traumatic neurasthenia are very severe, and one poor fellow was constantly moving his hands round to the place at the side where his bayonet hangs, or else fumbling where the cartridge clips are placed, and between these movements he was continuously looking over his head, evidently watching for the next shell passing near him. A number of others who had been hit about the pelvis and back exhibit symptoms precisely similar to those shown by persons who have been in a railway accident and been badly shaken up. Most of this type of case have apparently been hit by a piece of shell somewhere about the back, and they nearly all give the history that the pain did not supervene until twenty-four or forty-eight hours after the injury, and during the interval they continued fighting at their posts.

Another case of some interest was that of a Belgian who had been hit by a fragment of shell in the epigastrium and had promptly proceeded to vomit a considerable quantity of blood. This man had acute pain after food for about a fortnight, but has now recovered completely and has gone back to rejoin the Belgian forces. There have also been a number of cases of rheumatism, chiefly in the lower extremities and lumbar region, which get well in the course of three or four days under hot baths and massage.

Another interesting case was that of a man who had a bullet wound in the neighborhood of the stomach, but was evidently doing quite well until he had a rigor and a temperature of 104°. On examination, his blood showed numerous malarial parasites. This patient had never been out of Europe, but had traveled in Bulgaria. In the batch of Belgian wounded who came under my notice there was one man whose only ailment was bad temper, which was due to the fact that not understanding the language he had come over with the batch of wounded, being himself unwounded, and his anger was directed against those who had sent him as he wanted to return to the fighting lines. We insisted on his having three nights' rest and then sent him back.

The great difficulty with the Belgians is that most of them speak Flemish and not French, which renders conversation very difficult. However, although they strongly repudiate anything to do with Germany, we can keep up a limited conversation in German, and when at a loss for a word use the English equivalent. By this means and pantomime we manage to get on fairly well. So far over here we have not come across much typhoid among the wounded, and I understand from a friend at the front that there is very little of this disease in the British and Belgian lines.

The influx of Belgian refugees seems to have practically ceased. Those who have come over are now provided with accommodation throughout the country. Among the refugees I came across one unusual case, that of a missionary who had returned from the Congo suffering from sleeping sickness. He was being treated in Belgium, but had to get up and escape from there, and in this way came under my care.

In examining nurses physically for the St. John's Ambulance Association, I have come in contact with sundry people with interesting experiences. One lady had been nursing Bulgarians in the recent Balkan war, and when I asked what sort of wounds they suffered with and which were fatal, she replied that no wounded were ever found, and that all the cases she had to nurse were cases of typhoid, typhus, and smallpox. Another who had been in the same parts told me that the Turks who were put into uniform and wore puttees and boots for the first time suffered from gangrene of the feet. Yet another who had recently come from Brussels related that the German officers prefer to be nursed by English nurses rather than by Dutch or German, because the English were so much more gentle and delicate and exposed their patients much less in changing garments or dressings, and making beds, etc. She also reported that the German wounded whom she had seen were perfectly nice and behaved in every way in the proper manner. Among the nurses applying for service with

the St. John's Ambulance Association there are a large number who have come over from the colonies, notably Australia, the Cape, and India, and they are all very anxious to obtain work out at the front. Only last evening I examined two nurses who had returned from the United States with the same object in view.

There is still a great dearth of medical men to fill resident appointments as well as senior members of the staff, and at some institutions unqualified men have to be put in residence in order to maintain the work of the place. This is, of course, unsatisfactory, but under the circumstances it is the best that can be done, and after all there is not such a great difference between a senior student and a newly qualified practitioner. It seems likely that this dearth of medical men will make itself felt more keenly, as a comparatively large number will be required to staff the million men who have recently joined Kitchener's army. Practices are almost impossible to dispose of, and death vacancies occurring at the present time go for a mere song. This is, of course, very bad luck for the relatives of those who happen to die at this time.

As regards the general public there does not appear to be as much illness as is usually the case at this time of the year, and the explanation suggests itself as being due to people being more economic as regards their food, and taking more exercise for the sake of economy. Whether this be correct or not, it certainly seems very clear that there is a diminished amount of the ordinary ailments which send people to the hospitals.

Medical schools still continue their courses as if nothing were happening, except that extra work has to be done by certain members of the staff owing to the absence of their confrères. There was, however, a very big falling off in the entry of medical students. Most of those who were physically fit have enlisted in the new army. In spite of this we find that a certain number of Belgian, Russian, and Japanese students, those of the latter two nationalities having studied in Germany, have come over to this country, and we are doing our best to provide them with medical education. The Russians appear to pick up the language remarkably easily, and after two months' stay here are able to converse freely and understand lectures and demonstrations. The Japanese, on the other hand, do not acquire our language at all readily and are very difficult to understand: they do not seem to open their mouths properly when talking.

I mentioned in a former letter that we had been instructed to be careful as to dispensing certain drugs, but as a matter of fact, at the present time, there is no inconvenience, and personally I have not had any notification that any drugs ordered were out of stock or unobtainable.

Everything in London is proceeding in the usual way except as regards the lighting of the streets at night. These are still kept in darkness. Excursion tickets are issued, but on approaching or leaving London by night the blinds of the railway carriages are drawn down in order to keep the light from falling on the railway track. These changes and the fact that more men in khaki are seen than usual are the only indications of anything abnormal.